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THE BRITISH FERNS

BY

C. W. JOHNSON



THE

BRITISH FERNS.

THE

BRITISH FERNS

POPULARLY DESCRIBED,

AND

ILLUSTRATED BY ENGRAVINGS OF EVERY SPECIES.

FORMING

A COMPLETE HISTORY OF THE FAMILY AS REGARDS THEIR CHARACTERISTICS, PECULIARITIES, NATURAL PLACES OF GROWTH, AND THE MOST SUCCESSFUL METHODS OF CULTIVATING THEM.

BY

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EDITOR OF "THE COTTAGE GARDENER," &C.

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INTRODUCTION.

No Natural Order of plants attracts more attention than the Ferns, and that attention is attracted by their elegance, the freshness of their verdure, the peculiarity of their structure, and the ease with which most of them are cultivated. To assist the searcher after, and the cultivator of these plants, and to afford him a guide as free as possible from the jargon of botanical language, were the leading considerations in preparing these pages.

The engravings, for the most part, will enable any one, without other assistance, to ascertain the name of any species he may possess, or, if he knows its name, the alphabetical order of the work and the index will enable him to refer readily to full particulars concerning its history, description, and cultivation; but some readers may wish for a guide to the systematic arrangement of the British Ferns, and for their use we offer the following information.

The Ferns (*Filices*) are flowerless plants, with a root-stock spreading underground (*rhizoma*), from which arise, uncoiling usually in a spiral form (*circinnate*) the fronds or leafy stems; the under surface of the fronds is traversed

by veins, producing, in British Ferns, one-celled cases containing the seed (*spores*).

Mr. Sowerby having objected to our use of the classification we adopted in the First Edition of this work, and also to some of the magnified portions of the parts of fructification, we have been led to a closer consideration of these subjects, and we rejoice in being able to say that the result of such consideration is a greater amount of correctness.

The improved classification is as follows:—

POLYPODIACEÆ.

Fructification placed on the back of the frond, naked, having neither the usual covering nor covered by the margin of the frond. Ring vertical. Vernation coiled.

CETERACH.—Masses of fructification oblong, or nearly linear, straight, covering not apparent; mid-veins parallel or oblique, vein-branches uniting at their points.

POLYPODIUM.—Masses nearly circular, scattered in spots, without covering. Edge of frond not bent back.

GYMNOGRAMMA.—Capsules seated on the forked veins of the fronds; covering none; seeds triangular.

ASPIDIACEÆ.

Fructification placed on the back of the frond, and either furnished with a cover or having the margin of the frond turned back over it. Ring vertical. Vernation coiled.

WOODSIA.—Masses nearly circular, scattered in dots; receptacle membranaceous, flat, somewhat plate-shaped, fringed with incurved hairs.

POLYSTICHUM.—Masses circular, covering circular, fixed

to the frond by its centre on the upper branches of the side-veins.

LASTREA.—Masses nearly circular on the back of the side-veins; covering irregularly kidney-shaped, attached to the frond at the indentation in its kidney shape.

CYSTOPTERIS.—Masses small, nearly circular, seated at the back of the main side-veins; covering hood-like, fixed by its broad base beneath the masses, which it covers when young, the margin where it opens fringed, finally turned back.

ASPLENIUM.—Masses in lines, placed on the lateral veins; covering membranaceous, flat, opening towards the mid-vein.

ATHYRIUM.—Masses nearly circular, scattered; covering solitary, circular, peltate, or kidney-shaped, attached to the frond by its centre or side, opening on the side next the mid-vein, and edge of opening fringed, the fringe turning back.

SCOLOPENDRIUM.—Masses line-like, oblique, double, opposite, parallel; covering membranaceous, opening in the middle over the masses in opposite pairs.

PTERIS.—Masses on the margin of the leaflet in an uninterrupted line; covering opening from the bent-in edge of the frond.

ALLOSORUS.—Masses circular, placed on the transverse forked veins, finally covering the back of the contracted leafit; covering very narrowed, formed by the rolled-back edge of the leafit; seeds triangular.

BLECHNUM.—Masses in continuous line next each side of the mid-vein; covering membranaceous, flat, opening next the mid-vein.

ADIANTUM.—Masses line-like, or partly round, on the

margin of the leafit, inserted in the covering; covering, being a continuation of the leafit's outer skin, scale-like, opening on inner side.

HYMENOPHYLLACEÆ.

Fructification placed on a receptacle at the margin of the frond at the end of a vein. Ring horizontal. Vernation coiled.

TRICHOMANES.—Masses on the margin in a somewhat bell-shaped receptacle, with a central bristle-like column, to which the masses are attached.

HYMENOPHYLLUM.—Masses attached to a central, rather club-like column, in an erect two-valved receptacle.

OSMUNDACEÆ.

Fructification naked, arranged in a cluster on a stalk at the end of a frond. Vernation coiled.

OSMUNDA.—Masses in cases nearly globular, netted, stalked, opening lengthwise from their base as high as a transparent dorsal projection; the cases borne in a cluster or panicle.

OPHIOGLOSSACEÆ.

Fructification naked, arranged in a cluster on a stalk attached to a frond. Vernation straight.

OPHIOGLOSSUM.—Masses in a jointed two-rowed spike, in cases joined at the base, one-celled, opening at the side.

BOTRYCHIUM.—Masses in compound one-sided spike, adnate; capsules globular, stalkless, leathery, half two-valved, opening rather on the side.

THE BRITISH FERNS.

FERNS have long been popular plants; nor is their popularity confined to one class of society, and for this reason,—while all Ferns are beautiful, some of them are so cheap as to be within the purchasing power of all, and others are so scarce and costly as to be worthy companions of all that is rich and rare among the gems of the Stove and Conservatory.

The popularity of Ferns, however, does not rest only upon their beauty and their price, for they have, as an additional cause for their ready access to the good graces of the cultivator, that there is scarcely any place in which Ferns of some genera refuse to grow. Most of them thrive best in the shade; others prefer the brightest light; a third group will live only on dry walls and chalky rocks; a fourth succeed nowhere, except in abundant moisture; a fifth revel in the freest air of the mountain top; and a sixth flourish verdantly for months, and even years, within the close confinement of a Wardian case. Thus all purses and all situations—if

neither the one nor the other are absolutely barren—can command a supply of Ferns.

Notwithstanding their accessibility, and notwithstanding their popularity, it is as extraordinary as true that no popular work upon even the Hardy Ferns, combining a description of each species and its culture, has yet been published. We have excellent scientific works upon the Ferns, and we have general directions for their cultivation, but nothing which an amateur can read with pleasure, or consult for specific directions. It is hoped that this volume will supply this deficiency; for our notes will not be a mass of dry technical terms, which only the palate of a mere botanical collector can relish, but will be a mingling of what we think will be interesting to all, whether derived from our own observations, or from the observations of others. Moreover, we shall endeavour to use terms which all can understand; for our object, especially, is to benefit and gratify those who love plain truths in plain words.

Ferns are flowerless plants with stems, yet in this country the leaves are far more strikingly developed than are the stems.

"In our Ferns," says Mr. Henfry, "the stem is indeed occasionally erect, rising a few inches from the ground, and expanding its wide leaves (or *fronds*, as they are usually called) in a circle; but in a greater number it creeps along beneath the ground, being, in fact, a rhizome similar in the nature of its growth to that of the Sedges, and other flowering plants. This rhizome bears small separate (adventitious) roots on the

under side, while at intervals from the upper spring leaves, which, when young, are very pretty objects, being curled up in a kind of scroll, that gradually unrolls as they rise upward. The bodies which represent the seeds here (called *spores*) are usually produced in formations growing upon the backs of the leaves, and it is principally upon the mode of arrangement of these formations (called *sori*) that the classification of Ferns is founded.

"The common condition of the apparatus in which the spores are produced may be described as follows:—On the backs of the leaves, round patches, or streaks, or lines running round the borders of the divisions, appear, which in a perfect state have a brown, powdery aspect. This appearance is concealed in many kinds, in the early stages, by a membranous cover enclosing the brown dust; when the spores are more advanced, these coverings (called *indusia*) become either wholly or partly detached, and if examined with a magnifying glass, are found to have peculiar forms in different kinds of Ferns, and to be attached sometimes by little stalks, and sometimes by their edges. If we place some of the brown dust-like substance under a microscope, we find it to consist of a number of little cases, which, when ripe, burst, and discharge the very minute spores which have been produced within them. The bursting of the cases results from the elasticity of a kind of thickened band (the *annulus*), which extends around the membranous case, or *spore-fruit* (*theca*). The spores are mostly so small as to be invisible singly to the naked

eye, and consist of single vesicles of various shapes, often beautifully ornamented with markings on the exterior.

"Some Ferns bear their spore-fruits in a somewhat different way. In the *Osmunda*, or Royal Fern, the division forming the end of the leaf consists of a spike covered with capsules (spore-fruits), which differ slightly from those above described. In the Adder's-tongue and Moonwort, the spores are produced in fronds (called fertile fronds), which are quite changed in character for this purpose, and appear like spiked inflorescences. These three last kinds are sometimes wrongly called Flowering Ferns.

"In germination, the *spore*, which is a mere vesicle and not a miniature plant, such as we find in a *seed*, grows and divides into a number of vesicles, which multiply and enlarge until they form a minute green, leaf-like patch, and from the surface of this the first leaf arises, as it does from the *plumule*, or terminal bud of the embryo in the flowering-plants."

"The *root* of the tribe of Ferns," observes Mr. Keith, "assumes a great variety of different aspects in different species. In *Botrychium Lunaria* it is fibrous; in *Aspidium dilatatum* it is tuberous; and in *Polypodium vulgare* it is creeping and covered with scales. In *Pteris aquilina*, or Common Brakes, it is sometimes described as being spindle-shaped; yet this is not strictly the fact. If a frond is taken and pulled up with the hand, the portion of it is indeed spindle-shaped; but the real root, or rather rhizoma, or root-stock, from which you have

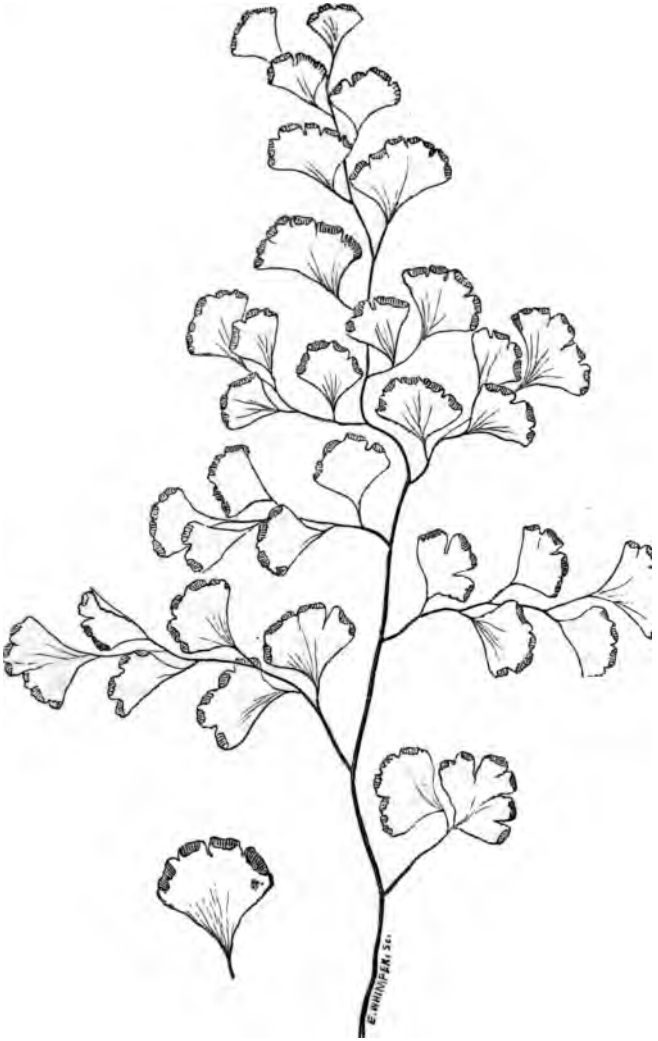
thus detached the frond, remains still in the soil, elongating in a horizontal direction at the depth of from three to four inches, sometimes simple and sometimes branched, but always furnished with lateral fibres.

"The *trunk* of Ferns—if trunk 'it can be called which trunk is none'—is a stipe supporting the frond; or rather the whole of the herbage is a *frond*, that is, an incorporation of stipe (or stem), leaf, and fructification. If the stipe of a Fern is cut open, it will be found to consist of a firm pulp, or pith, interspersed with bundles of longitudinal fibres of a dusty brown colour, assuming an arrangement proper to the species. On a transverse section of the stipe of *Pteris aquilina* (Common Brake), taken a little above the surface of the soil, the divided extremities of the bundles exhibit a slight resemblance to an oak-tree in full leaf. This has been noticed even by the peasantry of the country, among whom it is known by the name of 'King Charles's Oak.' But if the section is taken in a slanting direction, then the resemblance exhibited is that of the Eagle of the Roman standard; whence we have the specific name, *aquilina*.

"It was for a long time believed that Ferns are destitute of *seeds*, and propagated nobody knows how. Yet no botanist of the present day doubts the reality of Fern-seed, or, at the least, of sporules from which new plants spring. Some have even fancied that they had detected the parts of the antecedent flower. But admitting that such detection is impracticable, the botanist

can, at least, direct his attention to the mode of fructification, and to the fruit produced. In Ferns, strictly so called, it is dorsal; that is, scattered in clusters or patches on the back of the frond. These patches are generally accompanied with an integument called the *Indusium*, which, at the period of the maturity of the seed, bursts open, sometimes towards the nerves, and sometimes towards the margin; but in plants of a similar habit, uniformly in a similar manner. The merit of this discovery is due exclusively to Sir J. E. Smith, who found it to be a most decisive criterion for the determining of natural genera, and the only sure ground on which the botanist can rely. When this integument bursts, the fruit, now ripe, escapes, which is for the most part a capsule surrounded by an elastic and jointed ring opening transversely, and discharging the enclosed seed or sporule, which is a small and minute globule, discoverable only by the microscope, and capable of giving origin to a new plant. Ferns were raised from the sowing of their seeds in 1789, by Mr. J. Lindsay, of Jamaica, as also by Mr. J. Fox, of Norwich, about the same time."

From that time Ferns began to obtain more notice from gardeners, and there is now no order of plants of which the propagation and culture are better understood.



ADIA'NTUM CAPI'LLUS VENE'RIS.

ADIANTUM CAPILLUS VENERIS

This most elegant Fern was not known by our early botanists to be native of this country. Gerarde says, "The right Maiden-hair groweth upon walls, in stoney, shadowy, and moist places near unto fountains, and where water dropeth. It is a stranger to England; notwithstanding I have heard it reported by some of good credit, that it groweth in divers places of the west country of England." Parkinson had heard it "reported that it is found in Gloucestershire." Ray, in 1686, says, "it rarely or never occurs in England;" nor was it known for certainty that it is a native of this country until found by Mr. Llhwyd (Lloyd) at Barry Island and Porth Kirig, in Glamorganshire, about the year 1700, and it was first announced in the third edition of Ray's *Synopsis Methodica Stirpium Britanicarum* (vol. i. 123), published in 1724.

Root black, scaly, and with wiry, fibrous rootlets. *Fronds* usually six inches high, but under favourable culture twice that height; evergreen in sheltered situations, but usually dying in winter and reappearing in May. *Stipe*, or stem, of the frond, slender, and dark purple, the lower half of its length without leaflets. The branches of the stem are very slender, and alternately on opposite sides of it, and the leaflets are similarly placed on the branches. *Leaflets* irregularly fan-shaped; the fertile leaflets deeply cut on their edges, and the barren leaflets sharply-toothed. They are all of

a pale, semi-transparent, bright green colour, and having doubly-branched veins. The *fructification* forms a kind of margin to the lobes of the fertile leaflets, and when perfect, in July, becomes of a deep brown, as shown on the magnified leaflet in our drawing.

This Fern is of rare occurrence in this country, being found chiefly in our mildest and moistest districts, Devon, Cornwall, South Wales, and Ireland. It has been found, however, on the Islands of Arran, and on the banks of the Carron, in Scotland. Much more abundantly does it occur in the warmer countries of Europe, Northern Africa, Asia, and North America.

CULTURE.—Although a native of Great Britain, yet it is only found here in moist, sheltered situations; and, therefore, it is useless to attempt to grow it either upon ordinary rockwork or borders, in the open air. It requires to be cultivated under glass in a moist, moderately warm air. It is generally kept as a pot plant in the frame, greenhouse, or moist stove. In the latter it grows and flourishes marvellously. In its wild state, the little plant may be found growing from three to six inches in height, whilst in the moist, shady part of the stove it is to be seen varying from six to twelve inches, forming one of the most beautiful and interesting of evergreens all the year round.

It is said, by Mr. Houlston and Mr. Moore, that in the warmer climate of the south of Europe, the Channel Islands, and Madeira, this Fern attains the height of eighteen inches, and is then called *Adiantum Moritzianum*; but our native plant, if cultivated in a moist

stove, with a high temperature, will produce fronds of magnitude equal to those from the south of Europe or Madeira, with which they are precisely identical

The best way to cultivate it is to keep it as a pot plant; and the pots should be always placed in pans, and the pans should be nearly always supplied with water, whether in the stove, greenhouse, frame, or window. Whenever the pots or pans become foul, or the smell of stagnant water is perceptible, withhold the water for a day or two, and let the pots containing the plants be nicely washed, and the pans too. This should be attended to particularly at all times. Old, well-established plants, thus attended to, will stand and flourish in the same pots for many years undisturbed. Occasionally remove all decayed fronds from the plant. If one season is better than another, the month of April is the best time for potting or dividing this Fern, as it is readily increased by division. The best soil for it is lime-rubbish, sandy-peat, and pebbles, in equal proportions. The pots should be always thoroughly drained, using broken potsherds for this purpose, with a little moss over, to prevent the earth from getting in among the drainage. The little root fibres seem to delight in finding their way among the broken crocks.

Uses.—In the days of the old herbalists the true Maiden-hair Fern was considered not only efficacious in many diseases, but especially potent in promoting length of tresses, and to this attributed power it owes its name, both among the Latins and the moderns. So succulent are the leaves, that under strong pressure

they yield about three-fourths of their weight of juice. This juice gave the name to a well-known syrup—*Capillaire.* If this has any medicinal virtue it arises from the Orange-flower water forming one of its ingredients.

To MAKE CAPILLAIRE.—Maiden-hair leaves five ounces; Liquorice-root, peeled and sliced, two ounces; boiling water five pints. Let them remain for six hours; strain, and then add thirteen pounds of the finest loaf sugar, and one pint of Orange-flower water.



ALLOSO'RUS CRI'SPUS.

ALLOSO'RUS CRI'SPUS.

This has various local names, such as *Crisped* or *Curled Fern*, *Parsley Fern*, *Stone Brakes*, and *Mountain Parsley*. Names allusive to some one or other of its peculiarities. Crisped and Curled refer to the form of the leaflets; Parsley, to its resemblance to that plant; Stone, to its love of rocky or stony soil; and Mountain, to its frequenting Alpine localities.

Its generic name is derived from the Greek *allos*, diverse, and *soros*, a heap, referring to the varying forms of the patches of its fructification, or *sori*. The specific name, *crispus*, or curled, is explained by what we have said already relative to one of its English names.

A friend used to call this his "pet, pit, pot Fern," and of a truth, it is not only most beautiful of form, but of that diminutive size which seems so needful to entitle anything animate or inanimate to the worthiness for being petted.'

The main body of the *root* lies horizontally just beneath the surface of the soil, producing many fibrous rootlets. The *fronds* arise in May, or early in June; their *stalks* are from two to six inches long, slender, smooth, waved, and pale green. The leafleted portion is of a further length of from one-and-a-half to three inches. There are two kinds of fronds, one kind being barren, and the other fertile. The *leaflets* of the *barren fronds* are altogether alternate, by which we intend that

they are alternate on the branchlets, and the leafits and their lobes are also alternate.

By "alternate" is meant, first on one side, and then one on the other side, each leaflet, leafit, and lobe, being opposite to the space between two leaflets, leafits, or lobes, on the contrary side. The leafits of the barren fronds are pale bright green, wedge-shaped, finely-toothed on the edges, and frequently crisped or curled. The *fertile fronds* are considerably taller than the barren fronds, and their *leafits* are spear-head-shaped, and smooth-edged. The fructification, or *sori*, are in lines along the under margin of the leafits, as represented in the magnified leafit of our engraving, but the margin is so rolled back as to conceal the sori, as on one side of the leafit in that engraving. After the spores or seeds have ripened and been discharged — which in their native state occurs in September—the sori so spread out, that they cover the whole of the back of the leafit, except its midrib.

In our engraving, which is of the natural size, the fertile frond is in the centre

Allosorus crispus is a Fern rather rare in this country, being confined to its northern parts and mountains. It affects rocks, heathy places, and old walls. It has been found in Rutlandshire; at Tenterfell, near Kendal, in Westmoreland; on Cader Idris, in Merionethshire; and on Snowdon, in Carnarvonshire; at Borrowdale, in Cumberland; and in the Highlands of Scotland.

It was unknown to old Gerarde and to his editor Johnson; nor do we find any mention of it as a native

plant until 1696, when Ray, in the second edition of his *Synopsis Methodica Stirpium Britannicarum*, describes it as found in Westmoreland, and other places, by Mr. James Sutherland, the first curator of the Edinburgh Botanical Garden. Ray calls it, as it was called by its first describer, Schwenkfeld, *Adiantum album crispum alpinum* (Curled Alpine White Maiden-hair). Linnæus, who knew less about Ferns than about any other of the great divisions of the vegetable kingdom, named it at one time *Osmunda*, and at another time *Pteris crispa*, whilst some botanists have called it *Cryptogramma*, and others *Phorolobus*, but the best authorities now agree that J. J. Bernhardi, at the commencement of the present century, was correct when he separated it from all other Ferns, and named it *Allosorus*.

Uses.—We have seen that Ray and other early herbalists considered this Fern an *Adiantum*, or Maiden-hair. In those days plants were chiefly examined for their medicinal qualities, and all herbalists then agreed with our earliest writer on Plants, Dr. William Turner, that of the *Adiantums*, "the juyce stayeth the heare that falleth off, and if they be fallen off, it restoreth them agayne." But it is quite certain that his remedy is as defective as his spelling and grammar.

Though deficient in medicinal qualities, this Fern, as we have already noted, is well worthy of culture for its elegance.

Culture.—When cultivated, it should be grown upon well-drained rockwork, moderately shaded, kept moist,

and planted in a mixture of loam and peat, and all the better if a portion of bricks, broken up into small pieces, be mixed with it. But with all the care bestowed upon such plants, they will disappear at times, therefore, the cultivators of such beautiful and interesting plants should always keep duplicates in well-drained pots, and the pot-kept plants should always have winter protection, but during the summer months such pots can always be placed out-of-doors in some suitable place. The plants should always be well-established in pots before being turned out in the border or rockery.

This Fern is readily increased by division in the spring months. It grows luxuriantly in the greenhouse or vinery, under the shade of the Vines. A little protection can be given to any of these choice little Ferns, even when they are planted out upon the rockery, or in the border, by placing a hand-glass over them.







ASPLE'NIUM ADIA'NTUM-NI'GRUM.

ASPLE'NIUM ADIA'NTUM-NI'GRUM.

THIS, the Black Maiden-hair-like Spleenwort, is popularly known as the *Black Maiden-hair*, and *Oak Fern*. Its main *root* is black, scaly, and furnished with many wiry, dark-coloured rootlets. The *fronds* rise from the crown of the root, and vary in height from three inches to nearly two feet. The specimen fronds from which our drawing was taken, and which is about one-third the natural size, were about fifteen inches high. These greater heights are attained by the Fern when growing in a shady situation and rich soil, as was our specimen at Sherfield, in Hampshire. The *stem* of the frond is dark chesnut-coloured, and glossy; the part joining the root scaly; about half of its length bare, and the other half leafy. The leafy portion has a lengthened-triangular form, the lower pair of the leaflets being longest, each pair above them being gradually shorter and shorter, until they pass insensibly into the single terminating leaflet. The *leaflets* are also lengthened, triangular in form, and are more or less alternate, and so are the leafits composing each leaflet. The *leafits* are spear-head-shaped, and so finely toothed at their edge as almost to appear fringed. The pair of leafits nearest the main stalk of the frond are so deeply cut as to be divided into still smaller, or sub-leafits. They all are bright light green on the upper surface, but the under surface is much paler.

The *fructification* (sori) appears at first in oblique

whitish lines, varying in number from three to seven, on the under surface of the leafits. The whiteness arises from a thin covering (called the *indusium*), which bursts with a smooth edge on the side next the mid-vein of the leafit. The covering finally peels off, and then the sori, which are brown, spread until they cover the entire back of the leafit, all but the edge. This spreading, or running together, of the fructification is called confluent by botanists. The seed, or spores, are in various states of growth from April to October.

There are two varieties, *acutum* (very pointed), and *obtusum* (blunt). The only differences between these and the species we have described are that the fronds, the leaflets, and leafits of *acutum* extend to a longer and sharper point, whilst those of *obtusum* are more rounded. The intermediate forms are so various, that we really consider the above not entitled even to the subordinate distinction of a variety.

Variegatum is a more certain variation, for it is very distinctly variegated with cream-colour. It was found on the church of Shottisbrook, in Berkshire, during 1847, by Mr. Silver.

The generic name, *Asplenium*, is derived from *a*, not, and *splen*, the spleen, alluding to the supposed medicinal power of some of the species to lower the activity of the spleen. The specific name, *Adiantum nigrum*, is literally translated in the popular title, Black Maiden-hair.

This is one of the common Ferns of the British Islands, being found very generally on old walls and

among stones in shady places. It is spread over all Europe, and was known as a native plant to our earliest herbalists. Gerarde says it grows "upon trees in shadowie woods, and now and then in shadowie banks, and under hedges." We never found it upon trees, nor have we spoken of it to any one who has. Ray is more correct in stating that it is found "in shadowy places at the roots of trees and shrubs; in shaded fields, and on old walls generally." The same author is the first of our native botanists who gave an accurate description of this Fern; a description which he published in the first volume of his "Historia Plantarum."

This Fern is one of the best among our native Ferns to examine as an illustration of the peculiar packing, or rolling up of the fronds previously to their expansion to the light and air. The point of the frond is turned inwards, so that as the frond unrolls the upper surface is always outwards, and the lower, or seed-bearing surface is always within and protected

In Ray's time, the latter half of the 17th century, this Fern was believed to be a beneficial medicine in coughs, asthma, and some other diseases, and even Hoffmann recommended its use as an anti-scorbutic, but it is no longer employed even by herbalists.

It is a Fern very useful to the cultivator of this Natural Order of plants, for it is evergreen, and will thrive in pots under glass even better than upon rock-work in the open air. Hence it is a good tenant for a Wardian case. It will endure continued exposure to bright sunshine, and is then of a dwarf stature, but

under shade, and in a favourable soil, it attains a medium size. The soil best suited to it is a mixture, in equal parts, of sandy loam, leaf-mould, limy rubbish, and pebbles.

It is easily propagated by dividing the crowns in early spring. April is as good a month as any for this purpose.



ASPLE'NIUM FONTA'NUM.

ASPLE'NIUM FONTA'NUM.

THIS bears the English names of the *Rock Polypody*, *Slender-stemmed Polypody*, and *Smooth Rock Spleenwort*. Why the specific name *fontanum* was ever applied to it we cannot discover, and such specific name is singularly inappropriate, since so far from delighting in *fountains*, it is found only on dry rocks and old walls.

The *root* is dark-coloured, short, and thick, furnished with many rootlets, and terminating in a scaly tuft, from among which arise the *fronds*. These fronds vary in height from three to eight inches, but rarely exceed four inches. They grow in an erect tuft, as represented in our drawing. A very small portion of the stem, or stipe, is without leaflets, and the scales of the root are continued up a part of that unleafleted portion. All the leafleted part of the stem has a narrow wing of a leafy texture running up opposite sides, between the stalks of the leaflets. The *leaflets* are pale green, alternate, and lengthened egg-shaped, some being divided into leafits similarly shaped, but others near the top of the stem are only deeply notched. The *fructification*, or sori, is very accurately described by Mr. Moore as being produced two or three (sometimes five, as in our magnified specimen) on a leaflet, on the side veins, and near where they join the mid-vein. The sori, he adds, are short, oblong, sometimes distinct, but often running together (confluent), and, occasionally, occupying nearly the whole under surface of every leaflet. "They are

covered by an opaque, white, oblong skin (indusium), more rounded on the loose edge, which is turned towards the mid-vein, than on that edge by which it is attached to the leaflet; the loose edge being, also, waved and rather toothed." — (*Moore's Handbook of British Ferns.* 150.)

Many botanists have doubted the claim of this Fern to be considered a British species, but we think its claim as fully established. That it has been found but seldom, and in few places, is no counter-evidence. It is often passed by, probably, without examination, being mistaken for *Asplenium trichomanes*, and other common species.

The first to announce this as a British Fern was Mr. Hudson, in the first edition of his *Flora Anglica*, published during the year 1762. He states that it grew upon "rocky places near Wybourn, in Westmoreland." Mr. Bolton, in his *Filices Britannicæ, or History of British Proper Ferns*, published in 1786, states that this Fern was found on the walls of Agmondesham (Amersham) Church, in Buckinghamshire. In 1838, Mr. Readhead found it on rocks in Wharncliffe Woods, Yorkshire. Mr. Charles Johnson discovered it, in 1845, on an old wall on Tooting Common, Surrey. More recently it has been found by the Rev. W. Hawker, on a wall at Ashford, near Petersfield, in Hampshire. Mr. Shepherd, of Liverpool, sent specimens to Mr. Moore, which had been collected at Matlock, in Derbyshire. Mr. Hutcheson, formerly gardener at Boxley Abbey, Kent, and a Fern cultivator, gathered it in 1842, on

rocks near Stonehaven, in Kincardineshire. Thus, it has been found by competent judges in various parts of England, in Ireland, and in Scotland, and it would be worse than irrational to maintain that in all these places it had been accidentally introduced by spores brought from continental Europe.

The rarity of this Fern is in a considerable degree accounted for by the fact of its being unable to sustain our climate, except in sheltered, and thoroughly suitable situations.

To grow it in perfection, and to preserve it evergreen, it must be cultivated as a pot plant, and have glass protection the whole year, with shading from the scorching sun's rays during the summer months. It may stand in a pan to receive water, when required, but, in general, it should be sparingly watered, compared with the generality of Ferns, and yet never allowed to go dry.

Like most of the family, it is readily increased by careful division of large or old plants, in open weather during the spring months, and being planted in a mixture of sandy peat and broken bricks, or old mortar, or both. A little of this mixed with the soil is found beneficial to the plants, and particular attention is required to have good drainage. This drainage is best formed of fresh broken bricks. The roots of all Ferns seem to delight in finding their roots among this material. The pots should, in all cases, for this particular kind, be better than one-third filled with drainage, then a little moss over the drainage to prevent the earth

going down among the broken bricks. When the drainage is thus all right, the plants may be watered more freely and safely. When shifting these plants into larger pots the drainage should be as before directed, and the crowns of the plants should be kept considerably higher than the rim of the pots. This is an essential.

One of the greatest points in the culture and keeping these scarce and choice Ferns, is carefully to give them water, and to shade them when needed, and not to disturb them so long as they are doing well. The outside of the pots the specimens stand in should be washed occasionally, as well as the pans which the pots stand in.

Ferns, like other plants, sometimes become infested with Aphides, to destroy which they should be fumigated with tobacco-smoke.

When specimens are seeming to tire of their soil, or are become too large, then is the best time for division, or to make a number of plants out of one scarce one, for not till then would we divide a fine specimen of a Fern.



ASPLE'NIUM GERMA'NICUM.

ASPLE'NIUM GERMA'NICUM.

This, among many other names, has also been called *Asplenium alternifolium*, because the leaflets are more distinctly alternate than in most other Ferns, but as all the species are, for the most part, alternate-leaved, this is an objectionable name; and so, indeed, is *germanicum*, for this species is native of other countries besides Germany. However, it is better to put up with an inappropriate name, rather than to encumber the student with synonymes.

Our drawing is of the life-size; for this Fern varies but little in height between three and five inches. Its main *root* is black, furnished with many rootlets of the same colour, and crowned with a tuft from amid which arise the *fronds*. The stem of these is so deep a purple at the bottom as to appear black; the lower half is unleafleted, and the upper half is green, and furnished with but a few widely separated leaflets, very distinctly alternating. The *leaflets* are pale green, narrow-wedge-shaped, tapering into slender stalks, and the top of each leaflet is deeply notched, and one notch in the lower leaflets is so deep as to form a lobe. There is no mid or main vein to the leaflets, but small parallel veins, some of which have the fructification along their inner edge. The *fructification* (sori) are covered by a narrow membrane, the opening edge of which is whole, or at most indented, but never jagged. The *spores*, or seed, are ripe in August, at which time the fructifica-

tion on each leaflet has united together, or become confluent.

Linnæus considered this a mere variety of the *Asplenium ruta-muraria*, or Wall Rue; and it is decidedly much resembling that, as it does also *Asplenium septentrionale*, or Forked Spleenwort, yet it is very distinct from each.

It is found, but not abundantly, in Germany, Switzerland, Italy, France, Hungary, and Sweden; but was not known to be a native of Great Britain until discovered at the close of the last century, somewhere about 1792, by Mr. Dickson. He found it on some rocks in the south of Scotland, and published his discovery in the second volume of the Linnæan Society's Transactions. In that country it has been found on rocks in the Tweed, near Kelso, in Roxburghshire; on the Stenton Rocks, near Dunkeld, in Perthshire; and near Dunfermline, in Fifeshire. In England it has been found at Borrowdale and Scaw-fell, in Cumberland; on Hyloe Crags, in Northumberland; and in Wales near Llanrwst, and in the pass of Llanberis. These are the only localities at present known as its dwellings, and even there it is not abundant, so that it is one of the rarest of our Ferns. It seems entirely to have been passed unnoticed by Gerarde and others of our earliest botanists.

In its wild state its fronds die during the winter; but cultivated in a cold greenhouse, from which frost is excluded, it remains evergreen.

It requires a very light, poor soil, and we have found it thrive most and permanently in a mixture of equal

proportions of sharp river sand, sandy peat, and limy rubbish. One-third of the pot in which it is planted should be filled with drainage of broken potsherds. Nothing destroys this Fern so soon as an excess of water either about its roots or its foliage.

The soil in the pot should rise to a conical point, and in that point the Fern should be planted with the tufted head of its root well above the surface, so that water cannot settle in it. If grown under a bell-glass, this should be taken off daily, and be raised at the sides almost continually to avoid a close, damp atmosphere, for such an atmosphere is injurious and even fatal to the plant if long continued. We prefer growing it in a greenhouse where a bell-glass is not needed. It must be shaded from the sun; and in watering, no water must be poured over the crown of the root.

Unless all these precautions are taken this Fern will not live under cultivation. Its dislike of a close atmosphere precludes it from the Wardian case, for which its diminutive size renders it peculiarly suitable

ASPLE'NIUM LANCEOLA"TUM.

In English this has been called *Spear-shaped Spleenwort*, *Lanceolate Spleenwort*, and *White Oak Fern*.

The main body of the *root* is black, tufted, and covered with bristle-like scales; the rootlets are also black and numerous. The *stem*, or stipe, of each frond, up to where the leaflets commence, is purplish-black, and throughout its entire length is more or less sprinkled with fine, bristly scales. The length of the fronds varies as much as from three to fifteen inches. Mr. Moore says they are sometimes eighteen inches. They attain the greatest height when favourably cultivated under shade in a warm greenhouse. The specimen from which our drawing was taken is six inches high. The outline of the entire leafy portion of each *frond* is spear-head shaped, or lanceolate, to which the specific name alludes. The upper half of each stem and the leaflets are very bright, pale green. The spear-head shape of the frond is caused by the lowest leaflets being shorter than those immediately above them, and then the upper leaflets again gradually diminish in size. The *leaflets* have a triangular, or arrow-head outline, and though sometimes in opposite pairs, yet they are generally alternate; they for the most part stand at a right angle with the stalk, but sometimes droop slightly. The *leafits* are reversed-egg-shaped, blunt at the upper end, but deeply, and sharply-toothed, *the teeth* being as fine as bristles; the leafits at their



ASPLE'NIUM LANCEOLA'TUM.

lower end taper off gradually into a fine foot-stalk; they have a slightly twisted mid-vein, from which proceed forked side-veins, one to each division between the teeth. The *fructification*, or sori, is in irregular-placed masses, several on each leafit, at first longish oval in form, but gradually running together, and spreading over nearly the whole leafit, and becoming of a rusty brown; the cover or membrane (indusium) is oblong, whitish, with a jagged margin, always separating at the side towards the mid-vein. The *spores*, or seeds, are ripe in August and early in September.

This species is found in the crevices of rocks and on old walls in the south of England. Upon rocks on the north side of the Isle of Jersey, and other parts of the Channel Islands; about St. Ives and other places in Cornwall; at Tonbridge Wells and its vicinity; and in a few places in Oxfordshire, Devon, Gloucestershire, Sussex, Somerset, Carnarvonshire, Denbighshire, Glamorganshire, Merionethshire, and Pembrokeshire. Mr. Bolton states that he found it on a wall in a village near the river Wharf in Yorkshire, and Link says it occurs near Gilphead, in west Scotland, and in Ireland, but these localities require confirmation. Mr. Sweet, in his "Bristol Flora," says it occurs there in "Oldbury Court Woods, and in lanes about Stapleton. The area of this plant is not more than half-a-mile, occurring on the Old Red-Sandstone."

Sometimes the outline of the frond becomes almost triangular, the lowest leaflets being the longest, and it is then very much resembling *Asplenium adiantum-*

nigrum, so much so, that Mr. Bolton thought it only a variety, but from this species it is always to be distinguished by the form and position of the fructification.

The first author we find mentioning the *Asplenium lanceolatum*, is Lyte, in his translation of Dodoen's Herbal, published in 1578, if it is what he there calls *Dryopteris candida*, or White Oak Fern; and if so, Lyte adds—"Mathiolus and Ruellius, both men of great knowledge, do call it in Latin, *Osmunda*. Wherefore we, considering the property of this herb in taking away hair, do think good to name this herb in our language, *Osmund Baldpate*, or *Pilled Osmund*"—to *pill* being an old word for *to rob*. We are not certain that either Lyte, or Johnson (the editor of Gerarde), or Parkinson, really alluded to this species of *Asplenium* under the title of *Dryopteris candida*, but we bow to the judgment of the late Sir J. E. Smith, who so states in his "English Flora," iv. 298.

It was not until the second edition of Ray's "Synopsis Stirpium Britannicarum" appeared, in 1696, that this Fern was announced as a native of the British dominions, for it is there stated that Dr. Sherard had found it "on the rocks on the north side of the Isle of Jersey." In 1724, in the third edition of the same work, its discovery in England was first noticed. "Mr. Bobart having found it in the north porch of the church at Adderbury, in Oxfordshire. Dr. Woodward found it also in England."

Although an English Fern, it is of a delicate habit, and only grows wild in peculiarly-sheltered, well-

drained, yet moist situations. It grows well in a warm greenhouse, shaded from the sun, and kept moderately moist. Its stature is then much increased, and the brightness of its evergreen verdure is intense. The best soil for it is a mixture of peat, limy rubbish, bricks broken as small as filberts, and leaf-mould, in equal proportions; the pot it grows in being filled one-fourth with broken crocks for drainage. It may be propagated by division in April, but every piece separated must have a crown. It will not bear the close, damp air of a Wardian case.

ASPLE'NIUM MARI'NUM.

In English this is known now as the *Sea Spleenwort*, *Sea Maidenhair*, and *Dwarf Sea Fern*, but Gerarde, and others of our early herbalists, called it the *Female Dwarf Stone Fern*.

Its main *root* is black, scaly, and tufted, furnished with many intricately interwoven rootlets. From the tuft arise the *fronds*, which vary in height from three to nine inches. About one-third of the lower part of each stalk is naked, and brownish-purple, crooked at the bottom, and from where the leaflets commence, up to the summit of the stalk, there is a narrow, thick wing, or border, on each side, joining the base of the leaflets to each other. The *leaflets* are dark green above, but paler underneath, leathery, more or less alternate, very short-stalked, very irregular in form, but where most regular somewhat of an egg-shape, and almost always less than an inch in length, and mostly about half that length; often lobed on the upper edge at the broadest end, and the margin more or less toothed or cut throughout. They are nearly all of equal length, so that the outline of the frond is strap-like but pointed. The *mid-vein* of each leaflet is prominent, and the side-veins are variously forked. Attached to the upper edge of these side veins is the *fructification*, which, following their direction, slants sideways but upwards. The fructification is on almost every side vein, and spreads, but is never confluent, nor even crowded. The



ASPLE'NIUM MARI'NUM.

membrane, or cover of the fructification is uninterrupted, even, of a pale brown, and opens towards the mid-rib of each leaflet. The surface of each *capsule* of the fructification is curiously netted, and of a chesnut-colour.

This has been known as one of our native Ferns as long since as the time of Gerarde, 1597; at least so we conclude, from his saying that it "groweth under shadowy rocks, and craggy mountains in most places." This, however, is giving it too wide a range, and his editor, Johnson, in 1633, confines himself to saying, "It grows in the chinks of the rocks by the sea-side in Cornwall." Ray found it "on the rocks about Prestholm Island, near Beaumaris, and at Llandwyn, in the *Isle of Anglesea*; about the Castle of Hastings, in *Sussex*, and elsewhere on the rocks of the southern coast." It has also been found on Marsden Rocks, *Durham*; *Isle of Man*; Black Rocks on the *Cheshire* side of the Mersey; near the Dingle, *Liverpool*; Hulme Stone Quarry, near *Warrington*; west coast of *Cornwall*; Ormeshead, near *Bangor*; Nigg, in *Ross-shire*; near Port Patrick, *Wigtonshire*; *Moray*; *Isle of Staffa*; *Fifeshire*, *Aberdeenshire*, and *Berwickshire*. In Ireland it has been found on the Sutton side of Houth Moun tain, Underwood Killiney Hill, and other places near Derrinane, in *Kerry*; and frequently on the western and southern coasts. It has been gathered on the rocks under the Powder House, Shirehampton, near Bristol, where the water is brackish, but Mr. Swete observes that "this can hardly be considered a natural station

of this Fern, it being seldom found higher up the Bristol Channel than Clevedon."

Ray, who, like many clergymen of his time, combined the study of Medicine with that of Divinity, is rather strong in the narration of the medicinal qualities of this Fern. He says—"It is given in obstructions of the viscera, but especially of the spleen. Its gummy extract applied outwardly to burns has afforded relief when all other applications have failed." (*Synopsis Methodica Stirpium Britannicarum.* 119.)

We know of no one who has succeeded in cultivating this Fern in the open air. Its roots cling so firmly to the sides of the chinks of the rocks where it grows naturally, that they are scarcely capable of being separated from the rocks undestroyed, and seemingly afford a warning that the soil and situation they prefer must be sedulously provided for them.

It should be planted in a well-drained pot, in a mixture of equal parts sand, small fragments of brick, and peat, and kept in the most shady part of a greenhouse, where the temperature never falls below 35°. The water employed should have half-an-ounce of common salt dissolved in a gallon; and this Fern should not be watered over the leaves, though it delights in a moist atmosphere, and, therefore, flourishes under a glass shade. When grown "in a hothouse it will attain a large size, and when the air is kept moist, does not require a glass. In such circumstances, I have seen the fronds eighteen or twenty inches long; certainly it

luxuriates in warmth."* (*Sowerby's Ferns, by Mr. Charles Johnson.*)

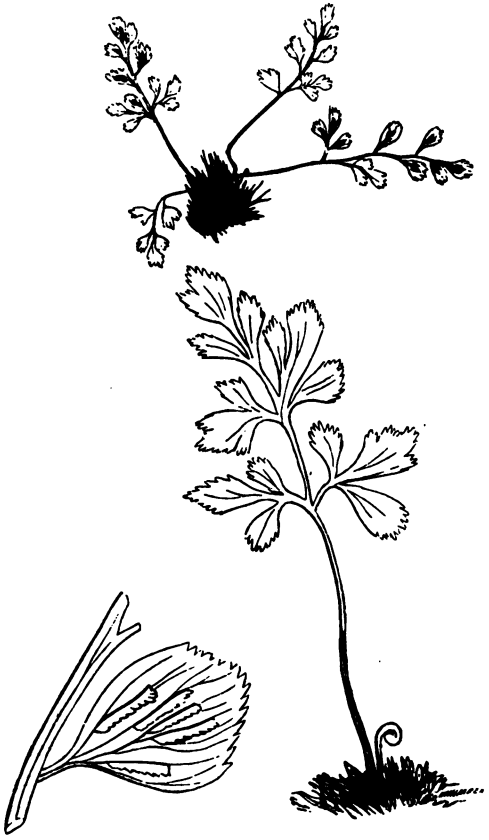
Two slight varieties of this Fern have been noticed. One has the leaflets much narrower, and more pointed, so as to have a spear-head form, and has been named *Asp'enium marinum* var. *acutum*. The other variety was mistaken by Mr. Hudson for the *Adiantum trapeziforme*, of Linnæus, and was called by him *Asplenium trapeziforme*, but it is only *A. marinum* with leaflets more deeply toothed and jagged, than ordinary. It was sent from Scotland by Dr. Alston to Mr. P. Collinson, and was subsequently found in that country in coves of the sea-shore near Wemys, by Mr. Lightfoot.

* An evidence of its liking warmth is afforded by its being found a native not only of the south of France and Spain, and in northern Africa, the Canaries, and Madeira, but in no other part of Europe.

ASPLE'NIUM RU"TA-MURA'RIA.

THIS is called *ruta-muraria*, or *Wall Rue*, because its young leaves somewhat resemble those of the common Rue, and because, when away from its native mountains it is rarely found growing anywhere but in the mortar on old walls. It is also called *White Maidenhair*, because its full-grown leaves slightly resemble those of the true Maidenhair Fern, and because they have upon their surface a mealy, or glaucous secretion. It is sometimes called the *Rue-leaved Spleenwort*, *White Spleenwort*, and *Tentwort*.

The main, cone-shaped tap *root* is dark brown, scaly, furnished with black wiry rootlets, and tufted. From the tuft arise the *fronds*, which vary in height from one to four inches. Our cut represents them in both their dwarf and more luxuriant growth. They are most dwarf when growing upon walls, and tallest when found upon the mountains. Leaf stalk green, except quite at its base, and there it is dark brown. About one-half of the stalk naked, and the other half clothed with *leafits* mostly in threes, and two threes together, the middle branch only being alternately leafleted, and that not always. The leafits are stout, deep green, wedge-shaped, or partly rhomboid, stalked, spreading horizontally, or slightly drooping, their end blunt, or rounded, and deeply, irregularly notched. The barren leafits are broader and shorter than those which are fruitful. All have equal-sized veins spreading in a fan



ASPLE'NIUM RU'TA-MURA'RIA.

form, and extending to the notches or teeth. The *fructification* is in lines on the inner side of the veins, and when ripe is dark brown, but at first covered with a white membrane (*indusium*), which is soon lost as the fructification spreads, runs together, and finally covers the whole underside of the leafit. The indusium bursts with a jagged edge on the inside; but, as Mr. Charles Johnson observes, this is of small importance in specific distinction unless far more decided than in this instance.

This Fern sends up its new fronds in May and June, and they retain their verdure all the winter. The fructification is ripe in August.

It is found in moist, shady clefts of limestone rocks and in the crevices of old walls, abundantly in the midland and southern counties, but more rarely in those of the north and east of England. It is a native, also, of most parts of Europe, and from New York to Carolina, in America.

It was known to our earliest herbalists as a native of this country. Thus, Gerarde says, "Stone Rue groweth upon old walls near unto waters, wells, and fountains. I found it upon the wall of Dartford Church, in Kent, hard by the river side, where the people ride through; and also upon the walls of the churchyard of Sittingbourne, in the same county, in the middle of the town, hard by a great lake of water; and also upon the church walls of Rayleigh, in Essex; and in divers other places." Matthiolus was the first to call it *Ruta muraria*, or rather *Ruta muralis*, and Gerarde names it after him, "Wall Rue, or Rue Maiden-hair," as well as Stone Rue

Others, says Gerarde, call it "*Salvia vitæ* (Preserver of Life), but wherefore I know not, neither themselves, if they were living."

The best mode of raising this Fern, if desired for cultivation, is to collect the spores, or seeds, when ripe in August, and to sow them in a mixture of limey rubbish and leaf-mould, in a pot under a bell-glass, until the seedlings appear. Keeping it moist, and in a shaded part of the greenhouse. The glass must be removed when the seedlings are up. If attempted to be transplanted from a wall, it can very rarely be done successfully, unless the two bricks between which it is growing can be previously removed, so that the roots may be but slightly injured. The best time for thus moving it is just when it begins to grow in April. Plant it in a soil composed of three parts of rubbly limey-rubbish, one part sand, and one part leaf-mould. The pot must be well-drained, be kept constantly slightly moist, and in the shade. It requires a free exposure to air, which is the cause of its languishing under a Wardian Case.

It is not improbable that the way in which the cone like main-root of this Fern *tents* or probes between the rocks or bricks where it grows, may have given rise to its old name of *Tent-wort*, which in that case is synonymous with *Probe-wort*. Shakspere makes use of this now almost obsolete word in more than one passage. Thus, when Hamlet proposes to have "something like the murder of his father" performed before the king, he says:

"I'll observe his looks
I'll *tent* him to the quick."



ASPLE'NIUM SEPTE'NTRIONA'LE.

ASPLE'NIUM SEPTE'NTRIONA'LE.

THIS is known to English herbalists by the name of the *Forked Spleenwort*, a name given to it on account of the form of its fronds. Its specific name, *Septentrionale*, alludes to its frequenting the *northern* districts of Great Britain.

Its *root* is woody, branched, tufted, and furnished with a mass of crooked, fibrous rootlets. From the tufts arise very numerous *fronds*, forming dense patches. They vary in height from two to four inches. The stalk, which is naked for about half its length, is wiry, and dark green, except at the base, where it is dark purple The upper part spreads into one, two, or three forked *leaflets*, which are narrow, strap-shaped, upright, smooth, and in colour a dull dark green. Each section of the fork has one or more teeth, and the sections are alternate. The upper surface of each leaflet is furrowed, but beneath, at first, they are covered with long white membranes (*indusium*), originating from the inner edge of the veins, and meeting over the middle. There is no mid-vein, but the veins arise from the base of the leaflet, and run parallel, and divide into as many branches as there are teeth at the end of each section of the leaflet. The *fructification* is dark brown, and as it increases in size, and runs together, it gradually throws off the membrane, and curiously twists the leaflet. The *spores* are ripe in August.

It can scarcely be called a rare Fern, for although it

has been found only in the extreme northern and western districts of England, partially in Scotland, and not at all in Ireland, yet wherever it does occur, there it is pretty abundant.

It occurs in clefts of rocks, on mountains, and on old walls, and has been found at Craig Dhu, and Carnedd Llewelyn, and Snowdon, in Wales; on Ingleborough, in Yorkshire; at Patterdale and Keswick, and above Ambleside, in Westmoreland; on rocks in Edinburgh Park; on Stenton Rock, near Dunkeld; and on rocks on the southern side of Blackford Hill, near Edinburgh.

It is not uncommon throughout Europe, but is especially frequent in Germany and Switzerland.

Gerarde is the earliest of our botanists who notices this Fern, and he mistook it for a Moss, calling it "*Muscus corniculatus*, Horned or Knagged Moss." The drawing he published of it, however, shews that it is the same as our Forked Spleenwort. Parkinson recognises it as a Fern, and describes it as the Naked Stone Fern (*Felix saxatilis Tragi*). Ray writes of it under the same Latin name, but also calls it *Horned or Forked Maidenhair.*

It may be cultivated as we have directed for the *Asplenium ruta-muraria;* but Mr. Charles Johnson is quite right in stating that "it is less adapted for exposure in the open Fernery, at least in the eastern parts of England, the evergreen fronds being liable to suffer from frost, and especially during the dry, piercing winds of Spring. It will, however, live and flourish when planted in a sheltered cavity better than under confinement. If potted, a cold, close frame, where it may be

kept with *Asplenium marinum*, *A. fontanum*, and such others, sheltered alike from the sun and cold, will answer for its culture better than the greenhouse, bearing in mind that the absence of all superfluous moisture must be strictly secured, and that the fronds of larger Ferns must not be allowed to spread over it." The tufted crown of the root should be raised well above the surface of the soil, which soil may be the same as for *A. ruta-muraria*.

ASPLE'NIUM TRICHO'MANES.

THIS is the *Common Maidenhair Spleenwort, Common Wall Spleenwort, English Maidenhair*, and *English Black Maidenhair* of our native herbalists.

The main body of the *root* is short, thick, dark purplish-chesnut, tufted, and furnished with many wiry rootlets of the same colour. From the tuft of the root arise many evergreen *fronds*, usually erect, but often spreading. They vary in length from two to twelve inches, and are simply a stalk clothed from the very bottom to the top with leafits. The *stalk* is smooth, very stiff, purplish-brown, and channelled in front. The *leafits* are very dark green, numerous, nearly stalk less, more or less alternate, about a quarter-of-an-inch long, gradually diminishing in size towards the top and bottom of the frond, oval but blunt at the upper end, and partially and irregularly scolloped at the upper edge. *Fructification* in six or eight masses, oblong, parallel to each other, but attached to the lateral veins passing obliquely from the mid-vein. The lateral veins divide into two, and sometimes three branches; the upper branch bearing the fructification. The *membrane*, or indusium, which covers the fructification, is whitish, and it separates with a wavy edge from the oblique vein to which it was attached, and then exposes the capsules of sori, which are dark buff, or brown, and soon run together, or, as it is technically termed, become confluent.



ASPLE'NIUM TRICHO'MANES.

There are three varied forms of this Fern. One, called *incisum* (cut), has the edges of each leaflt deeply and irregularly cut, so as to resemble the leaf of some of the Cratæguses. Another form has the leaflts so crowded together, that they overlap each other like the tiles of a house-roof; and in the third form, sometimes called *monstrosum* (deformed), the end of the frond is branched, or forked. This last variety was found by Mr. D. Dick, at St. Mary's Isle, Kircudbright, and by Mr. J. R. Kinahan, at Quin Abbey, Clare

This Fern is found in all parts of the British Islands, on the shady sides of rocks, old walls, and hedge-banks. In the situation last named it attains the greatest height. It is not confined, however, to our country, nor even to Europe, for it is found in various parts of Asia, Jamaica, and North America.

It was known as one of our native plants to the earliest of our herbalists, for in "The seconde parte of William Turner's herball," published in 1568, he calls it "*English Mayden's heare*," and the woodcut leaves no doubt that it was our *Asplenium trichomanes*. He says —"the juice stayeth the heare that falleth of, and if they be fallen off, it restoreth them agayne." Many other of our old medical writers speak of this Fern as that from which *Capillaire* is made, and there is little doubt but that it would impart as much virtue to that compound as does the *Adiantum capillus veneris*, or True Maidenhair, of which it ought to be made. It has, however, still some local reputation, the Highland dames of Scotland often forming from it a tea which

they administer to those who are afflicted with coughs or colds.

Gerarde is the first writer who mentions any place in England where it was native. He says—"I found it growing in a shadowy, sandy lane in Betsome, in the parish of Southfleet, in Kent. It groweth, likewise upon stone-walls at Her Majesty's (Queen Elizabeth's,) Palace of Richmond, and on most stone-walls of the west and north parts of England."

It will grow freely on the shady side of rockwork in the open air, but the soil must be composed only of sandy peat, old mortar, and fragments of brick in equal proportions. It can be grown in a Wardian Case, and in a greenhouse, but requires the same soil, perfect drainage, and a frequent change of air.

The best time for transplanting this Fern is in April. Those growing on a hedge-bank should be preferred for transplanting, because, unless the bricks can be taken with them, those growing on walls can scarcely be moved without a fatal injury to the roots. Those growing in the fissures of rocks are moved with quite as much difficulty and uncertainty of success as those on walls. Young plants should be preferred before old ones for removal. They should have a bell-glass turned over them for a few days after their transplanting. Plants already in cultivation may be propagated by division also in April. In dividing the tuft, a crown must be preserved to each division.

We have never raised it from seed, but we have no doubt that spores collected when ripe in August, and

sown upon the surface of the soil, such as we have directed for the growth of the plants, covered with a bell-glass, and placed in a shady part of a greenhouse, or of a cold frame, would give birth to seedlings.

ASPLE'NIUM VI'RIDE.

THIS is called, in English, the *Green Spleenwort*, *Green-ribbed Spleenwort*, and *Green Maidenhair Spleenwort*, and, indeed, it is its greenness, lighter and brighter in the leafits, and entirely so in the stalk, which chiefly distinguishes it from *Asplenium trichomanes*.

The main *root* is dark chesnut-coloured, and some what more carrot-shaped than that of *A. trichomanes*, the fibrous roots are also less numerous than in that species. The top of the root is tufted, and from the tuft arise the *fronds*. Of these the stalks are rather more upright, and more free from leafits at the bottom than in *A. trichomanes;* this bottom part is dark chesnut-coloured, but the whole of the upper part is green, and this is the chief permanent character distinguishing it from *A. trichomanes*, The stalk is smooth, the lower third without leafits, and the whole varying between about three and ten inches in height. The greater stature being found in specimens growing in moist, sheltered situations. The end of the frond is sometimes divided into two or three branches. The *leafits* vary much in form, being mostly rhomboidal, but sometimes egg-shaped, and at others spear-head shaped, usually tapering towards their stalk, which is very short and slender, not always alternate, and not so close together, nor blunt-ended, as in *A. trichomanes*. but their upper edges are much more scolloped than in that species. The mid-vein produces side-veins, usually



ASPLE'NIUM VI'RIDE.

alternate, which are mostly, but not always, forked, and their ends rarely extend to the edge of the leafit. The *fructification* is from two to six masses on each leafit, more yellowish-brown than in *A. trichomanes*, and more in the middle of the leafit than in that species, and though they finally usually run together and cover the back of the leafit, yet they never reach its edge, but leave a regular border of the leafit round the ripe fructification. At first the fructification is covered with a narrow membrane; but this is thrown off as the seeds (spores) ripen, which occurs about the end of August.

The frond branching at the end is not permanent even in the same plant, yet some botanists have distinguished it as a variety. It is the *Asplenium trichomanes ramosum* of Linnæus, and the *Trichomanes ramosus* of Bauhin and some others.

It will be seen from the above description that the species very closely resembles *A. trichomanes*, though, as observed by Mr. Francis, it is immediately distinguished from it by the lighter colour of all its parts, and especially the greenness of the stalk, its less-spreading fructification, differently shaped and more alternate leafits, which leafits on the lower part of the frond are generally wide apart, whilst the leafits near its top are more crowded, and the whole plant is much more delicate and graceful. — (*Analysis of British Ferns*. 52.)

It is found on moist rocks and old walls in some of our mountain districts. In *England*, not further south than Derbyshire; but it has been gathered in Northum-

berland; between Widdy Bank and Caldron Snout in Durham; on Mazebeck Scars in Westmorland; at Gordale, Ais-la-beck, Richmond, Settle, near Halifax, and at Black Bank, near Leeds, in Yorkshire. In *Wales*, on Cader Idris, Crib y Ddeseil, Clogivyn, and Snowdon. In *Scotland*, in Ross-shire, in Cawdor Woods, near Nairn, at the foot of Benmore, Sutherlandshire, and all over the Highlands. In *Ireland*, on Turk Mountain, Killarney; Ben Bulben, Sligo; and near Lough Eske on the Donegal Mountains. The branched sub-variety was found, by Mr. Plukenet, on a stone wall in Mr. Owen's garden, at Maidstone, in Kent, but we think this must have been introduced there.

Another sub-variety has been found with its leafits deeply lobed and cut.

It scarcely can be doubted that the old botanists and herbalists confounded this species with *A. trichomanes*, and we should not have been aware that they had noticed it at all, if Gerard, Bauhin, Ray, and others, had not mentioned the branched-fronded sub-variety, which Gerard called *Trichomanes fœmina*, whilst Ray and others described it as *T. ramosum*. The first botanist recognising it as a distinct species was Cordus, who, in 1561, published it in his "Historia Stirpium," under the title of *Adiantum album*, though he gives the same woodcut of it as he does for *Trichomanes*. The first to name it *Asplenium viride*, we believe, was Hudson, in his "Flora Anglica," published during 1762.

It is usually removed with much difficulty from its

native places, but we have succeeded in cultivating it by adopting the same precautions as we have directed for *A. trichomanes*. It requires, even more than does that species, attention to avoid stagnant air and stagnant water.

ATHY'RIUM FI'LIX FŒ'MINA.

THIS most graceful of all the British Ferns, on that account, well deserves its popular name of *The Lady Fern*. It is also known as the *Female Shield Fern*, *Female Polypody*, and *Drooping Lady Fern*.

Its *root* is large, brown, and tufted, often becoming, in old plants, very large and stem-like, but even then lying upon the surface of the soil. The *fronds* are remarkably lightly formed, plume-like, and graceful, rising in considerable numbers from the tuft, and forming a strikingly beautiful group. They vary in height from nine to eighteen inches; but whatever the height (which is greatest in moist, shady, sheltered situations), about one-third of the lowest part of the *stem* is without leaflets, but swollen at the base, which is also usually covered with long scales. The general outline of the frond is narrow spear-head-shaped. The *leaflets* vary much in their arrangement, being usually alternate, but, sometimes, opposite, and, sometimes, far apart, but in other instances very close together. They vary in number from twenty to forty pairs, are narrow spear-head-shaped, very gradually tapering to a single leafit, lower ones and upper ones often bending back, or drooping. The *leafits* very numerous, linear-oblong, or broad spear-head-shaped, sharp-pointed, lobed, and deeply-toothed, the lower lobes the largest. The *veining* very distinct, mid-rib, or vein, waved. *Fructification* on the upper edge of side veins in segment-of-circle, or kidney-shaped



ATHY'RIUM FI'LIX FŒ'MNA.

masses, becoming, finally, nearly round, but never running together; cover, or indusium, white, at first oblong with a broad base, afterwards kidney-shaped, but not swollen; it opens towards the mid-rib, the edge of its opening side being finely jagged. The *seeds* (sori) are numerous and brown.

No Fern native of the British Isles is so variable in its forms as this, and Mr. Charles Johnson justly remarks: —

"Such differences have afforded a wide scope for speculative botanists to indulge their fancies in the multiplication of species and varieties, and were the wishes and advice of all my kind correspondents to be attended to in regard to the latter, I might exhaust the Greek alphabet from alpha to omega in prefixes. The claim advanced on behalf of a few of the varieties to rank as species, should be very cautiously examined before its admission; those who recommend or incline to their adoption would do well to bear in mind the plasticity of vegetable nature, and the very uncertain tenure of specific distinction in the aggregate, not in this class only, but in groups far higher in grade, and in which features of more determinate character can be arraigned in evidence of supposed dissimilarity. The three principal forms, including the normal one, that are considered best entitled to the rank in question, are thus characterized:—

"1. *incisum*. Fronds more or less drooping, broadly lanceolate: pinnæ (leaflets) distant: pinnules (leafits) lanceolate, distinct, flat, pinnatifid with toothed lobes. Sori distinct. A. Filix-fœmina, *Roth*.

"2. *molle*. Fronds nearly erect, lax, lanceolate: pinnæ approximate: pinnules oblong, connected by the wing of the midrib, flat, toothed. Sori distinct. A. molle, *Roth*.

"3. *convexum*. Fronds nearly erect, rigid, narrow-lanceo-

late: pinnæ distant, convex: pinnules distant, linear, toothed or pinnatifid, convex, with deflexed margins. Sori short, numerous, eventually confluent. A. rhæticum, *Roth. Moore, Hanb.* 136. Aspidium irriguum? *Smith. E. B.* 2199. This is, unquestionably, the most decided charactered of all the forms, and less positively associated with them by intermediates.

"Besides the numerous slight variations in habit, and in the outline and division of the frond, several remarkable monstrosities are met with in cultivation; of these the variety *crispum* is the most common, and its dwarf, clustered, and much-divided fronds resemble a tuft of curled parsley—a figure of one of the fronds is given by Mr. Moore, Handb. 142. It was originally found by Mr. A. Smith, on Orah Hill, Antrim, Ireland, and since by Sir W. C. Trevelyan, in Braemar, Scotland. Another Irish variety, still more peculiar, is given by Mr. Newman, Hist. Brit. Ferns, 218."

It is not at all uncommon in the southern and midland counties of England, and is still more abundant in Ireland; indeed, so abundant upon its bogs as to be used as the common Brake Fern is in England, for packing fruit and fish. Except in particular localities, it is more rare in the northern parts of Wales, England, and Scotland.

Sir Walter Scott correctly described the situation it most delights in when he said—

> Where the copse wood is the greenest,
> Where the fountain glistens sheenest,
> Where the morning dew lieth longest,
> There *The Lady Fern* grows strongest.

It is found in many other parts of Europe and North America.

The *Lady Fern* is first mentioned as a British plant by Johnson, in his edition of Gerard's "Herbal," and we have the very rare pleasure of knowing not only the year but the day of its discovery. "Never," says Johnson, "have I seen any figure resembling this plant. It groweth abundantly on the shadowy, moist rocks by Mapledurham, near Petersfield, in Hampshire *John Goodyer*. July 4, 1633." It was known, however, both to Gerard and Bauhin, as a species of *Filix mas*, and the editor of Ray's "Synopsis" of British Plants, as late as 1724, describes it as "The Male Fern with thin-set, deeply indented leaves."

Modern botanists have not been unanimous about this Fern's characteristics, hence we find it in their volumes, not only as an *Athyrium*, but as an *Aspidium*, *Polypodium*, and *Asplenium*

April is the best season for propagating, either by transplanting, or by division of established plants. It is one of the easiest cultivated of all the British Ferns.

"When placed about rock work, it should occupy a low boggy situation at the base of the rock, being planted amongst turfy soil, kept thoroughly moistened, either naturally or artificially. It is far less beautiful if planted in dry exposed situations. Few hardy plants which can be introduced among rock work are so thoroughly lovely as a vigorous *Lady Fern*, placed just within the mouth of a cavernous recess, large enough to admit of its development, and just open enough that the light of day may gleam across the dark back-ground sufficient to reveal the drooping feathery fronds; and, what is more, it will delight to grow in such a situation, if freely supplied with moisture to

its roots. In woodland walks, or on the shady margin of ornamental water, no fern can be more appropriately introduced. When grown in a pot, it requires one of rather a large size, and should be planted in turfy soil, intermixed with fragments of charcoal, sandstone, or potsherds. To attain anything like a fair degree of its lady-like gracefulness, this fern must under all circumstances be well supplied with water."—*Moore's British Ferns.*



BLE'CHNUM BOREA'LE.

BLE'CHNUM BOREA'LE.

The English names by which this Fern is known are *Rough Spleenwort, Northern Hard Fern, Rough Milt-waste*, and *Great* or *Wild Spleenwort*. Its main *root* is black, scaly, tufted, and furnished with numerous stout rootlets. The *fronds* have a smooth and polished stalk but the leafless portion at the bottom is purple, shaggy and scaly. They are numerous, narrow-spear-head-shaped, tapering to a point at each end. The *barren fronds*, from eight to twelve inches high, are outermost evergreen, and become prostrate. They have numerous, close, parallel, spear-head-shaped, entire, single-ribbed *leaflets*, rather blunt, but with a minute point. The *fertile fronds*, always erect, and from twelve to twenty-four inches high, are surrounded by the barren fronds, and are not so numerous, but are taller, and their *leaflets* are much narrower, more pointed, more spread out at their base, and more distant from each other than those on the barren fronds. Their edges are recurved. The stalk mostly purple. The *fructification* is in a narrow line on each side of the mid-rib of each leaflet, and between two side veins which run slantingly upwards about half way to the edge of the leaflet, turn abruptly, and then run parallel with the mid-rib. The cover (*indusium*) is a whitish membrane, separating at the side next the rib, and exposing the very numerous crowded brown spores, each bound with a jointed ring. These are ripe about the end of August. All the

fronds are dark green. Sometimes a frond is partly fertile and partly barren.

Varieties of this Fern occasionally occur. In one, the leaflets are shortened, and assume the form of scollops with an irregularly toothed edge. In another variety the end of the frond is forked.

It is easily cultivated if moved from its native place early in April, with abundance of soil about the roots, so that these are disturbed but little, and if it is planted in some well-drained place, as rockwork, where it is shaded from much sun, and supplied regularly and abundantly with moisture. The soil for it is best composed of one part peat, one part leaf-mould, and two parts stiffish loam well mixed together. We have not found it thrive either in a Wardian case or in a greenhouse; but a writer in THE COTTAGE GARDENER, vol. xv., p. 261, says,—"Having grown it to a great extent, I can say, confidently, that it will grow, and that, too, most luxuriantly, in a greenhouse. I have had plants of it in twenty-four sized pots, throw out eight-and-thirty fronds, fourteen of which were fertile; and it was that, and a fine plant of *Scolopendrium, undulatum*, that attracted the notice of most visitors, for they were really noble plants. I have also grown each of these very successfully in a stove temperature, and also many other hardy Ferns."

It is found wild in various soils and places—in open healthy grounds, as well as in moist shady hedges.

It has been found in St. Faith's Newton woods near Norwich; at Hainsford in Norfolk; in lanes about

Acton Park, near Birmingham; at the bottom of the thicket in the vale of Dudecombe, near Painswick; abundantly on Hampstead Heath; in lanes about Bromsgrove Lickey, Worcestershire; at Trossacks, Loch Katrine; in Anglesea; in various parts of Hertfordshire, and of the northern counties. Mr. Francis says that it is spread throughout England and Scotland, and in Ireland,—especially in the counties of Wicklow and Clare. It ascends to 700 feet above the sea's level in Cumberland, to 800 in Forfarshire, and much higher in the Cairngorum Mountains in Aberdeenshire, where it probably attains to elevations of 1,200 or 1,300 feet.

It is of common occurrence in Denmark, Sweden, Norway, North-west America, and even in the Canary Islands, and at the Cape of Good Hope.

The first author who mentions this as a native of Great Britain is Gerarde, who says it "groweth in most parts of England, but especially on a heath by London, called Hampstead Heath, where it groweth in great abundance." In his "Herbal" as well as in Parkinson's, there is a very good wood-cut of this Fern. The last-named author says, "this is called *Fox Fern* in many places of this land." Dodoens, and all the other herbalists we have named, state that it "is very good against the hardness, stoppings, and swellings of the *Spleen* or *Melt*," and it is to this opinion that the Spleenworts, or Meltwastes, owe their generic name.

By more modern botanists it has been wildly named *Osmunda spicant*, *Blechnum spicant*, *Lomaria spicant*,

Asplenium spicant, and *Acrostichum spicant*. Spicant is its name in the German language, in which it was first named in modern times. It is curious that Linnæus, in total neglect of his own characteristics of the two genera *Osmunda* and *Blechnum*, placed this Fern in the genus first-named. This mistake was first pointed out by Haller, but it was not until 1793, in the "Memoirs of the Turin Royal Academy of Sciences," that this Fern was correctly placed among the Blechnums.



BOTRY'CHIUM LUNA'RIA.

BOTRY'CHIUM LUNA'RIA.

THIS is known as *Common Moonwort*, *Small Lunary*, and *Moonwort*.

Its *root* is composed of a slender tap-root, from which issue numerous simple, cylindrical, yellowish fibres, like those of a Hyacinth, and proceeding in a whorl, or circle, from the tap-root, but spreading horizontally in the soil. *Stem* simple, cylindrical, pale green, erect, nine inches high, with a few large, brown, sheathing scales at the bottom. It has only one *leaf* springing from about the middle of the stem, which leaf has five or six pairs of fan-shaped, pale milky-green, short-stalked leaflets, and a terminal leaflet of the same form. Each *leaflet* is scolloped, or toothed, on the edge, and, usually, more or less lobed. The stem ends in a doubly-compound *spike* of small, round, light brown *capsules*. These are nearly stalkless, and are arranged somewhat over-lapping each other on one flat side of the stalk, or receptacle. *Spores* oval, smooth, and, usually, jointed together in pairs.

There are three varieties, *viz*:—1. with several stalks and leaves; 2. with leaves much more cut and jagged than usual; and 3. with the leaflets divided into leafits.

Its usual birth-places are mountain meadows and pastures. It is not common, though found in various parts of England, Ireland, and Scotland. It has been collected in Westmorland; at Mear Bank, by Sykes

Wood, Ingleton, and at Settle, in Yorkshire; Scadbury Park, and Chisselhurst Common, Kent; on the north side of Bredon Hill, in Worcestershire; at Shirehampton, and on Kings-Weston-Hill, near Bristol; near Bury, in Suffolk; on Stratton Heath, in Norfolk; on coal-pit banks, near Stourbridge; at Bootle, near Liverpool; on the sea-coast between South Shields and Sunderland; on Oversley Hill, near Alcester; and near Alaw and Aberffraw rivers, in Anglesea. In *Scotland*, on Ardgarth Hill, to the north of Linlithgow; near Dundonalds, two miles from Little Loch Broom, on the west coast of Ross-shire, and in the Isle of Skye. In *Ireland*, on the rising ground of a meadow, about two hundred yards north of the second lock of Lagan Canal.

The first English botanist who mentions this Fern is Turner, who, in the third part of his "Herbal," published in 1568, gives a very good woodcut of the plant, and, after its description, adds, "it may be called wel in Englishe *Cluster Lunarye*, or *Cluster Moonwort*." Gerard, writing a few years subsequently, mentions many places where it had been found in England, and after describing its appearance, and stating its various appellations, proceeds to observe, that "Small Moonwort is singular to heal green and fresh wounds. It hath been used among the alchymists and witches to do wonders withall, who say that it will loose locks, and make them to fall from the feet of horses that graze where it doth grow, and hath been called of them *Martagon*, whereas, in truth, they are all but drowsy

dreams and illusions; but it is singular for wounds, as aforesaid."

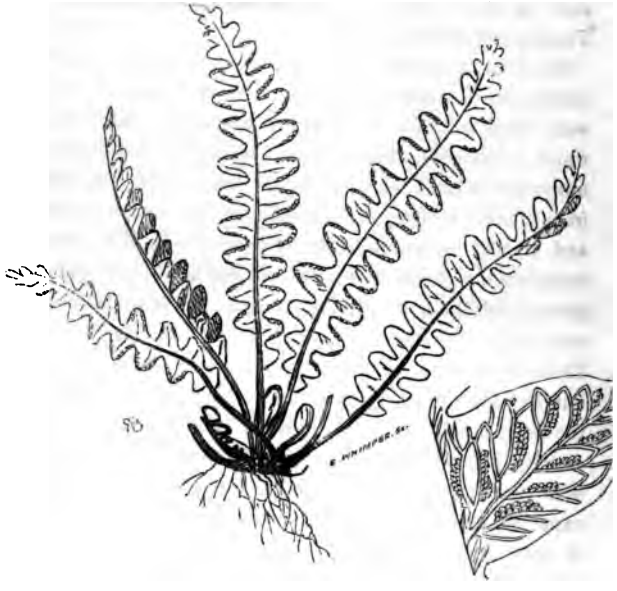
Bauhin, in his *Historia Plantarum*, gives a copious account of this Fern, with three very good delineations of it and it varieties. He says the alchymists employed its juice for fixing Mercury.

Coles, in his *Adam in Eden*, p. 561, tells us; "It is said, yea, and believed by many, that *moonwort* will open the locks wherewith dwelling-houses are made fast, if it be put in the key-hole; as also that it will loosen the locks, fetters, and shoes from those horses' feet that goe on the places where it groweth; and of this opinion was Master Culpeper, who, though he railed against superstition in others, yet had enough of it himselfe, as may appear by his story of the Earl of Essex his horses, which being drawn up in a body, many of them lost their shoes upon White Downe in Devonshire, near Tiverton, because moonwort grows upon heaths." Turner, in his *British Physician*, 8vo. Lond. 1687, p. 209, is confident that though moonwort "be the moon's herb, yet it is neither smith, farrier, nor picklock." Withers, in allusion to the supposed virtues of the moonwort, in the introduction to his Abuses Stript and Whipt, 1622, says:

> "There is an herb, some say, whose vertue's such
> It in the pasture, only with a touch,
> Unshooes the new-shod steed."

To induce it to grow in a Fern garden it should be moved with a square foot of the turf in which it is growing, and as much of depth of the soil undisturbed,

and planted upon an open, unshaded, well-drained situation. It requires a soil light, and mixed with a little peat. It likes to have its roots covered with turf, but even the grass must not overshadow it. We never succeeded well in its culture.



CE'TERACH OFFICINA'RUM.

CE'TERACH OFFICINA'RUM.

THIS bears the various English names of *Scaly Spleenwort*, *Rough Spleenwort*, *Scale Fern*, *Scaly Hart's Tongue*, and *Miltwaste*.

The *root* is fibrous, black, tufted, and scaly at the crown, penetrating deeply into the old mortar of the walls, and into the clefts of the limestone rocks, on which it delights to grow. The *fronds* are evergreen, numerous, tufted, and spreading; varying in height from three to eight inches; oblong, bluntish, deeply and bluntly indented at the edges, the indentations being alternate; the margin of the leaf smooth. When growing in sheltered, shady situations, the indentations often are so deep as almost to render the fronds leafleted. Their upper surface is smooth; in colour deep green, but slightly milky, or glaucous; the upper surface of the mid-rib is scaly. The under side of the fronds is entirely covered thickly with pointed, saw-edged, brown scales, lapping over one another. Before the fronds are expanded these scales are white and silvery. The *stalk* of each frond is about one-fifth of its length, dark-coloured, and covered with pointed, brown scales. If the scales are removed from the under surface of the fronds, the fronds will be found to have alternate lateral veins uniting at their points near the edge of the frond. The seed, or *sori*, are in oblong narrow masses attached, except the lowest mass, to the upper side of the principal branches of the veins. The covers

(indusium) of the sori are one on each side of each mass, membranous, continuous, quite distinct from the scales.

In *England* it has been found near Lancaster; abundantly about Settle, in Yorkshire; on limestone rocks, in Lath-hill-dale, and in Dovedale, Derbyshire; on walls about the quarries at Ludlow, Shropshire; on an old wall near Cowley, in Oxfordshire; on a wall at Tocknells, near Painswick, in Gloucestershire; at Martock, in Somerset; at Stapleton Quarries, near Bristol; at Cheddar, Malvern Abbey, and Bath; on the tower of Old Alresford Church, Hants; on walls on the east and north-east side of Winchester; at Topsham, and other places, in Devon; at Bury, in Suffolk; Heydon, in Norfolk; and Asheridge, in Hertfordshire. In *Wales*, in Denbighshire; on the walls of a ruin at Treborth, near Bangor. In *Ireland*, on the ruins of Saggard Church; on walls near Cork, and Kilkenny; on Cave-hill; and at Headford, in Galway. In *Scotland*, it has been found near Drumlanrig, in Dumfriesshire; on the ruins of Iona; at Drumlanrig Castle; and at Kinoul Hill, near Perth. (*Cottage Gardener*, xv. 398.)

We have never attempted to cultivate this Fern, and must borrow from Mr. Charles Johnson the following remarks upon the subject:—

"It is not at all easy to cultivate this fern successfully: it is too impatient of confinement to live long in a greenhouse; and the cold frame, so useful for the protection of other half-hardy species, is almost certain death to this

The metropolitan cultivator is told that London air disagrees with it, and yet the only plant of it I possessed in my early career, lived in a nook of an old wall, in a back area in Hatton Garden, for several years, and may be there still, unless eradicated by repair; sun never reached it, and ancient mortar, which, constantly moist, had somewhat the consistence of paste, probably agreed with its constitution; a very necessary point to be studied in planting, as when left to its own selection, or in the wild state, it seems universally to prefer a calcareous habitat. Whether planted in the open fernery, or grown in pots, great care must be exercised as to drainage, and in the latter case especially to avoid wetting the fronds in watering."

The first writer who describes it as an English plant is Turner. In the first part of his "Herbal," published in 1551, he says, "it groweth muche in Germanye, in old moiste walles, and in rockes; it groweth also in England about Bristowe (Bristol)." He adds, "I have heard no English name of this herbe, but it maye well be called in English Ceteracke, or Miltwaste, or Finger Ferne, because it is no longer than a manne's finger, or Scale Ferne, because it is all full of scales on the innersyde. It hath leaves lyke in figure unto Scolopendra, the beste, which also called Centipes, is not unlike a great and rough palmer's worme."

There is no doubt that it is the *Asplenium* mentioned by Dioscorides and others of the old Greek writers, who attributed to it a marvellous influence over the spleen; so marvellous that Vitruvius tells us it destroyed that organ in the Cretan swine which fed upon it. This opinion of the "Miltwasting" power of this Fern lasted

until the time of Elizabeth; for Gerarde, then writing, says, "There be Empericks or blinde practitioners of this age, who teach, that with this herbe not only the hardnesse and swelling of the Spleene, but all infirmities of the liver also may be effectually, and in very short time removed, insomuch that the sodden liver of a beast is restored to his former constitution againe, that is, made like unto a raw liver, if it bee boyled againe with this herbe.

"But this is to be reckoned among the old wives fables, and that also which Dioscorides telleth of, touching the gathering of Spleenewoort in the night, and other most vaine things, which are found here and there scattered in old books: from which most of the later writers do not abstaine, who many times fill up their pages with lies and frivolous toies, and by so doing do not a little deceive young students."

Although neglected as a medicinal herb, it is still of some commercial value, being used as a bait for rock-cod fishing on the coast of Wales. The Rev. Hugh Davies says, it was becoming very scarce about Holyhead owing to its consumption for that purpose.

This and some other Ferns are extremely retentive of life, of which we have this testimony from Dr. Daubeny, Professor of Agriculture, at Oxford.

"I have a specimen of *Hymenophyllum Tunbridgense* which has been preserved in a bottle, corked and sealed over, for more than three years, and which, even now, judging from its appearance, would seem to be living. For the first two years it looked as fresh as

when first introduced; and although some of the fronds have now become black and shrunk, many are still fresh and expanded.

"On communicating this circumstance to a correspondent, I received the following statement, which may be worth recording as an example of tenacity of life among Ferns, in common with their allies the mosses;—A lady in Ireland found among her dried specimens one of the *Grammitis Ceterach*, which had been above two years in a port-folio in a very dry, warm room, and after planting it in a pot and covering it close, she had the satisfaction to see it come again to life. Afterwards a fresh young frond came up, which continued to flourish at the time this information was given, and all the old ones have now withered away."

Dr. Daubeny, it will be seen, calls the *Ceterach officinarum* by another name, *Grammitis Ceterach*. It is so called by some botanists, whilst by others it is known as *Scolopendrium Ceterach*, *Asplenium Ceterach*, *Notolepeum Ceterach*, and *Gymnopteris Ceterach*.

CYSTO'PTERIS ALPI'NA.

THIS very pretty Fern has been variously named. Linnæus and others called it *Polypodium regium;* some entitled it *Aspidium regium;* and by a third group of Botanists it is described under the title of *Cyathea regia.* In English it is called *Alpine Bladder-Fern, Laciniated Bladder-Fern,* and *Three-cleft Polypody.* The name of *Bladder-Fern* was bestowed upon the genus because the indusium or cover of each mass of spores is inflated like a bladder.

The main body of the *root* is short, tufted, and scaly, producing numerous scattered dark-coloured fibrous rootlets. The *fronds* issuing from the tufted top of the root are numerous, varying in height from three to even twelve inches; they are bright green, their general outline spear-head-shaped, the leaflets so deeply lobed as to almost form leafits; and these lobes are mostly three on each side-stalk of the leaflet. Each lobe is egg-shaped, blunt, and very finely cut, or laciniated at the edges. The segments into which the lobes are cut are long-oval-shaped and partly notched, but not long and narrow, nor wavy-edged like those of *Cystopteris angustata,* nor are their ribs zig-zagged as in that species. The leaflets are almost opposite to each other, yet are just sufficiently otherwise to justify their being described as alternate.

The unleafed part of the *stem* (stipe) of each frond is



CYSTO'PTERIS ALPI'NA.

about one-third of its whole length; and is smooth except at the base, where a few brown pointed scales occur.

The *fructification* is near the edge of the lobe, and consists of very copious masses of little bladders, small, scattered, not crowded at any time, and pale brownish coloured. Whilst in a young state each mass is wrapped in a white, membranous, concave cover, ending in a tapering jagged point; thus nearly resembling *Cystopteris fragilis*, but the fructification is in smaller masses than those of that species, nor are the spores ever black as in that species, but are pale brown.

This is a Fern very rarely found in Great Britain; so rarely, indeed, that many Botanists have doubted, we think on insufficient grounds, its title to a place among our native plants.

Mr. Lhwyd first discovered it on Snowdon, as announced in the second edition of Ray's *Synopsis*, in 1696; Mr. Griffiths found it on Cwm Idwell in Wales; Mr. W. Christy found it on rocks at the dropping well of Knaresborough; Hooker states, on the authority of Mr. Maughan, that it was found on Ben Lawers in Scotland; Mr. Shepherd, of Liverpool, sent specimens to Mr. Moore, which specimens, he stated, were "gathered in Derbyshire and Yorkshire, but without assigning more particular habitats." Mr. Foster found it at Low Layton in Essex, and announced his discovery in Symon's *Synopsis*, some time in the year 1793. It has been found at the same place by Mr. W. Pamplin in 1835, and by Mr. E. H. Bolton in 1840.

Sir J. E. Smith thus speaks of its discovery and history:—

"The lowland station of this Fern, close to a much-frequented road at Low Layton, where I have, in company with the late Mr. Forster, seen it covering great part of a brick wall, may be supposed analogous to its places of growth in France; but we seek in vain for any information on this head either in Vaillant or Lamarck, nor is it evident that the latter ever found the plant. The wall at Layton has been repaired, and the Fern almost destroyed. On Snowdon it is said to be very scarce, though Mr. Wilson, with his usual bounty, has sent me an ample supply of specimens of various sizes. He describes it as "varying greatly in size and appearance, but always distinct from the *fragilis*." The *cover*, as that gentleman remarks, "is in both species, connected with the *frond* by its base only, at the lower side of the *mass of capsules*, that is, on the side next the base of the segment of the *leaflet*;" which agrees with my observations. This Fern is well compared by Bobart, in Morison, to the *Cicutaria* of old authors, our *Chærophyllum sylvestre*, so common on banks in the spring. It is unquestionably distinct from every other British Fern, though the proper name and synonyms were not discovered till after its appearance in *Engl. Bot.*, where I fell into the same error with some foreign botanists. Linnæus once thought it a Swedish plant, but erroneously, nor had he an original or authentic specimen.

"The remarks of Dr. Richardson, inserted between brackets, by Dillenius, in the third edition of Ray's *Synopsis*, 126. *n.* 8. *Ed.* 3., certainly do not answer to the present species; as my late friend the Rev. Hugh Davies, an excellent observer, first pointed out to me.

"John Bauhin's synonym, which Ray quoted with doubt, appears, by the really excellent figure, to be unquestionably

our plant. It must be either this, or *Aspidium alpinum*, *Willd. n.* 139., which is likewise a *Cystea*, figured in *Jac. Ic. Rar. t.* 642, and in *Segu. Veron. Suppl. t.* 1. *f.* 3. But neither the plant itself, not either of these representations, suits the wooden cut of Bauhin, which agrees far better with *C. regia*, particularly in the shape of the *leaflets*. Haller, very unsuitably I think, refers it to *Pteris crispa;* which circumstance, and the singular jumble of synonyms under his *n.* 1707, *Cystea fragilis*, induces a suspicion that he had not accurately observed these alpine ferns, and especially that he had never seen Vaillant's *Filicula regia* at all."

On the culture of this, and other species of the genus, we have been obliged with the following notes from Mr. W. Reeve, who has very successfully cultivated Ferns:—

"I have had several species of *Cystopteris* in my possession, but have not had all the species, but such as I have tried, I have always found to prefer and thrive best in well-drained situations. The only instance that I have of their cultivation, out-of-doors, was upon some rockwork which I formed at the north end of our conservatory, where there was a piece of brickwork (which did not look very sightly) about two-and-a-half or three feet high, and I formed this rockwork to hide it, but you may imagine that the more elevated part of it must have been very much drained, when I had only about eighteen inches for the base. It was upon this piece of work that I placed (among other small, young Ferns) a plant of each of the *Cystopteris* that I had in my possession. They were three in number, *Fragilis*, *Dickieana*, and *Alpina*.

"For cultivation in pots, I used, for compost, two parts

sandy loam, one of leaf-mould, and one of very finely-broken sandstone; or, in default of this, old mortar broken fine, with a little silver-sand added, and good drainage. Great points in potting these small species of Fern are the state of the compost, and the way it is mixed and used. It should be of a nice dampness. In mixing, it should not be rubbed too intimately together, but should be handled carelessly, as it were, and the plants potted firmly, in most cases, and if used in this state, and the plants are placed in a rather confined temperature, very little water must be given until they begin to emit new roots, which will not be long first, if the plant is in a healthy state; and even if it is not in sound health, the withholding of the water-pot from it will do it more good than the application of it. The moisture in the compost will be sufficient for the roots until fresh ones are formed, and the moist atmosphere will help to supply the fronds. When planted in the rockwork a similar compost may be used.

"Each of the species would make a nice plant for a Wardian case, I should think. I have grown *Dickieana* under a bell-glass for a considerable time, and I have a specimen of *Fragilis* by me that I grew in a close temperature, but *Dickieana* and *Alpina* objected to heat more than *Fragilis*."



CYSTO'PTERIS ANGUSTA'TA.

CYSTO'PTERIS ANGUSTA'TA.

THIS has various English names, and among botanists, with still more varied want of certainty, has been placed in various genera, or been reduced even to a mere variety.

It is known as the *Deep-cut Mountain Bladder Fern*, as the *Stone Polypody*, as the *Red-stemmed Polypody*, and in botanical works it is *Polypodium rhæticum*, *Polypodium ilvense*, *Aspidium fragile*, *Aspidium rhæticum*, *Cyathea fragilis*, var. *β.* and *Cystopteris fragilis*, var. *angustata*.

We think that it has sufficiently distinctive characteristics to retain it as a species. *Root* tufted, somewhat creeping, black, with rusty scales, and rootlets long. *Fronds* from six to fifteen inches high, rather numerous, erect; stalk dark-red becoming black, nearly half its length naked, without any border, slender, and smooth. *Leaflets* bright green, nearly opposite, the lowermost rather shorter, and the pairs at greater distances from each other than those about the middle of the frond, all leafited with scarcely a border down the side of the midrib. *Leafits* alternate, spear-head shaped, rather bluntly pointed, sometimes, however, tapering at the end, all deeply cut, with oblong wavy, pointed segments; and the ribs of all somewhat wavy. The segments are always long and narrow, never broad, rounded, or egg-shaped, but sometimes, though rarely, cloven at the end. The leafits on the upper side of each leaflet are larger

than those on the lower side; the cuts are all along the sides of the leafits. These characteristics distinctly distinguish this Fern from *Cystopteris fragilis*, and *C. dentata*. The *fructification* is round, and smaller, and less prominent than in those two species; always continuing distinct, standing either in solitary masses or in pairs, towards the bottom of each cut dividing two lobes from each other; at first pale, but finally becoming brown. The cover (*indusium*) white, very thin, concave, irregularly torn, soon pushed off, or aside, by the comparatively large, though not numerous, shining brown capsules.

It is found, but not commonly, in wooded places on mountains and on shaded rocks; as near Llanberis, in North Wales; at Gordale, in Craven, Yorkshire; on shaded rocks in many parts of Scotland; on the mountains of Westmorland; on the top of Glyder Mountains, on the side overhanging Llyn Ogwen Lake, and near Ffynnon felon, and on the Leek Road, about a mile from Buxton.

This Fern was first discovered in Rhætia, whence its earliest name of *Rhæticum*, but it is first mentioned as a British Fern by Gerard, if his *Filicula petræa mas* is really his name for the present species. There is, however, much uncertainty about the early history of this Fern, and this uncertainty has been thus well-pointed out by the late Sir J. E. Smith.

"Great confusion has always existed amongst our British botanists concerning *Polypodium* (*Cystopteris*) *rhæticum*. Hooker has it not. Lightfoot appears, by what he says in his *Fl.*

Scot. 678, to have been acquainted, like Mr. Dickson, with our *Cystea* (*Cystopteris*) *angustata* under that name; and he quotes Gerarde rightly, justly objecting to Plukenet's *t.* 179. *f.* 5. Lightfoot's description is excellent, though he submits, as I have formerly done, to Haller, Weis, and others, who consider it as a variety of our *C. fragilis*. The late Mr. Davall took it for Haller's *n.* 1705; but that plant, with many errors in the synonyms, is certainly *Aspidium dilatatum*. Our *Cystea* (*Cystopteris*) *angustata* may be *n.* 1708 of Haller, but his references are confused. Mr. Hudson, on seeing Mr. Davall's specimens of the Fern in question, declared it very different from his own *Polypodium rhæticum*, which indeed is *Aspidium dumetorum*. I have little scruple in referring the obscure and long-disputed figure of Clusius, reprinted in Gerarde, as above quoted, to this *Cystea* (*Cystopteris*) *angustata*, though the draughtsman has omitted the ultimate divisions of the *leaflets*, well enough expressed by Hoffmann and Villars. I have never received this Fern from Wales, but if it be not Ray's *Polypodium ilvense*, it is wanting in the *Synopsis*. The wooden cut of Dalechamp, copied in J. Bauhin, and quoted doubtingly by Ray, should rather seem to be the totally different *Acrostichum Marantæ*, as Bauhin himself suspected."

The cultivation required by this Fern is the same as for *Cystopteris alpina*, stated at page 102. It requires, however, more shade, and does well under the shadow of other plants in a cool greenhouse.

CYSTO'PTERIS DENTA'TA.

THIS is the *Toothed Bladder Fern*, or *Toothed Polypody*, and has been variously described as *Polypodium dentatum*, *Aspidium dentatum*, *Cyathea dentata*, and *Cystea dentata*, while some consider it merely a variety of *Cystopteris fragilis*. Like *C. angustata*, we consider it sufficiently distinct to be retained as a species.

Root tufted, small; rootlets scattered, rather woolly and black. *Frond*, pale green, generally correctly doubly-leafleted (bipinnate), some of the lower *leaflets* only, and these in luxuriant specimens, being simply leafited, or cut so as to be nearly leafited (pinnate or pinnatifid). The leaflets more or less spread horizontally; nearly alternate. *Leafits* egg-shaped, or rounded (our drawing scarcely shows them sufficiently so), blunt, abundantly but bluntly toothed; their ribs wavy, their bases not decurrent, though on a winged mid-rib. *Fructification* at the end of the veins, and when numerous, running together, or confluent, so as to seem like a border round the leafit. *Stem* about one half its length without leaflets, very slender, smooth, shining, in colour brownish-purple, and rather scaly at the base. From six to nine inches high, and not so brittle as in *C. fragilis*.

This species does not appear to have been noticed by the older botanists, and to have been first discovered by Mr. Dickson, about the year 1784, in clefts of rocks in the highlands of *Scotland*. In *Wales* it has been found



CYSTOPTERIS DENTATA.

at the foot of the walls of Castle Dinas Bran; in Flintshire, at Llangollen; in Denbighshire, on rocks north of the mansion of Trejorwerth, in Anglesea, and on Snowdon. In *England* it has been found between Widdy Bank, and Caldron Snout, in Durham.

It may be cultivated, probably, the same as directed for *C. alpina*.

CYSTO'PTERIS DICKIEA'NA.

This Fern was discovered in a cave upon the sea-shore near Aberdeen, and it has been named after its discoverer, Dr. Dickie. He found it during the year 1846, and we are not aware that it has been found elsewhere than in that cavern. Mr. Francis thinks that it is only a variety of *Cystopteris fragilis;* whilst Mr. Moore and Mr. Babington make *C. dentata* a species, and consider that *Dickieana* is a variety of this. With such authorities against us, we hesitate to express our conviction that it is a species. However, as we feel that conviction, we are bound to record it. Even those who describe it as a variety acknowledge that it retains its characteristics under cultivation, and we have been told that it is reproduced from its spores. If this be so, there can be small doubt of its title to be ranked as a species, and we shall be much obliged by the communication of any information on this subject.

Root tufted, pale brown. *Frond* dark green, pointed egg-shaped in its general outline; *leaflets* inclining to a horizontal position, and so close together that the leafits overlap those on the leafit next below. The leaflets are spear-head-shaped, and the *leafits*, if leafits they are, but they are so joined at their base as to be for the most part lobes, are crowded and overlapping, broad-egg-shaped, and finely-scolloped on their edges. The *fructification* is in very distinct masses, never running together, situated at the ends of the veins so as to form



CYSTO'PTERIS DICKIEA'NA.

ıg round each leafit, or lobe. The entire height rond varies from four to six inches; about one- ıf its *stem*, which is stouter than in any other of the genus, is without leaflets, and this un- l part is at the base covered with brown scales.

the above was written, we are confirmed in a ıory degree, by finding that Mr. Newman looks *Dickieana* as a possible, but by no means hed, species."—"It is a perfectly healthy plant, nstrous, nor distorted, and produced freely from ıcoming a perfect weed." If this be so, no doubt pon our mind that *C. Dickieana* is a distinct ; and that it does reproduce itself from spores e the additional testimony of Mr. Moore, who It is now common in cultivation, having been ted liberally by Dr. Dickie, and is found to ll its peculiarities, and to reproduce itself from

ts cultivation see page 102.

CYSTO'PTERIS FRA'GILIS

This Fern has been also called by modern botanists *Polypodium fragile*, *Polypodium album*, *Cyathea fragilis*, and *Aspidium fragile*. Fragileness or brittleness is a striking characteristic of its stems, and as in its Latin names this is uniformly alluded to, so is it in its English title of *Brittle Bladder Fern*, and *Brittle Polypody*.

Root tufted, scaly, black, and having numerous fibrous rootlets; it extends slowly, throwing out fresh crowns around the old one. *Fronds* many together, usually about six inches high, though in favourable situations, warm, moist, and shaded, they attain to nearly twelve inches. Their general outline is spear-headed but sharp-pointed, and their colour a bright green. The *leaflets* have the same spear-head form as the fronds, but are not so sharply pointed; they are not quite opposite, but so nearly so as scarcely to be described as alternate; they clothe rather more than half the stem, and are not regularly arranged. The *leafits* are usually alternate, pointed-egg-shaped, but in barren fronds blunt, tapering at the base and decurrent, their edge deeply, numerously, and sharply toothed; the lower leafits are so deeply cut sometimes as to be nearly formed into smaller leafits, and such form may be described as doubly-leafited. *Stem* reddish-brown, becoming almost black, very slender, brittle, juicy, smooth, but with a few scales at the very bottom. The *fructification* on almost all the side-veins, and near their end. It is in round masses, numerous,



CYSTO'PTERIS FRA'GILIS.

crowded, and finally running together; at first pale, but becoming black, and covering the whole back of each leafit. The cover (*indusium*) of the masses of spores is white, loose, membranous, sinking inward, irregularly jagged, sometimes lengthened to a point, but soon turned back, and forced off by the spores, which are black when young, but become browner with age.

This species is extremely liable to alter its form according to the temperature of the season, and the moistness or dryness of the situation; but such alterations are not in any way permanent.

It is not an uncommon Fern in mountain districts, especially on old walls, and chalky, damp, shaded rocks.

In *England* it has been found at Richmond, and Settle, in Yorkshire; Peveril Castle, Peak's Hole, Castleton, Lovers Leap, near Buxton, and Matlock, in Derbyshire; near Hyde, in Gloucestershire; Cheddar, in Somersetshire; in Nottinghamshire; near Bristol; on the ground from Bourn Heath to Wormsash, near Bromsgrove; and at Exwick, near Exeter.

In *Wales*, in a cave at Clogwyn Coch, Snowdon, rocks above Cwnn Idwel, near Twll Der, and near Wrexham.

In *Scotland*, in Aberdeenshire, Moray, Ross-shire, near Maens, in Berwickshire; Sutherland and the Kincardinshire coast; and near Killin.

In *Ireland*, in Kerry, at Lough Inn, and Lough Derryclare, Connamara.

The first time this Fern is mentioned as a native of Britain, we think, was in 1696, by Ray, in the second edition of his "Synopsis Methodica Stirpium Britan-

nicum." He calls it "*Filix saxatilis caule tenui fragile*; Fine-cut Stone Fern, with slender and brittle stalks. On old stone walls and rocks in the mountains of the Peak, in Derbyshire, and in the West-riding of Yorkshire, and in Westmoreland plentifully. Dr. Tancred Robinson found this Fern on the dropping rock at Knaresborough, from which the petrifying water distils."

The cultivation of this species is the same as that of *Cystopteris alpina* previously stated, and in addition we quote the following from Mr. Moore's "British Ferns":—

"From the delicate texture of this Fern, and its adaptability to various situations, it is well suited for cultivation; and grows vigorously planted either on rockwork or in pots, and placed either within a frame or without one in a sheltered and shady position; it however becomes most beautiful when developed in the damp close atmosphere of a frame or glazed case. The small size of the plant renders it more convenient for pot culture than many other kinds. The other species of Cystopteris are similar in habit, and may be cultivated in the same manner. The dormant crowns should not be kept too damp during the winter. They all propagate readily by separating the crowns whenever more than one is formed, and most of them form new crowns rapidly."



CYSTO'PTERIS MONTA'TA.

CYSTO'PTERIS MONTA'NA.

This has long been known as a Fern of the highest alpine districts of Europe, North America, and Kamtschatka; but it was not until 1836 that it was ascertained to be a British species. In that year it was discovered by Mr. W. Wilson on Ben Lawers, one of the Bredalbane Mountains.

It has been called by botanists *Polypodium montanum* and *myrrhidifolium*, *Aspidium montanum*, *Cystopteris montana* and *myrrhidifolia*, and *Cyathea montana*. In English it is known as the *Mountain Bladder Fern*, and *Wilson's Bladder Fern*.

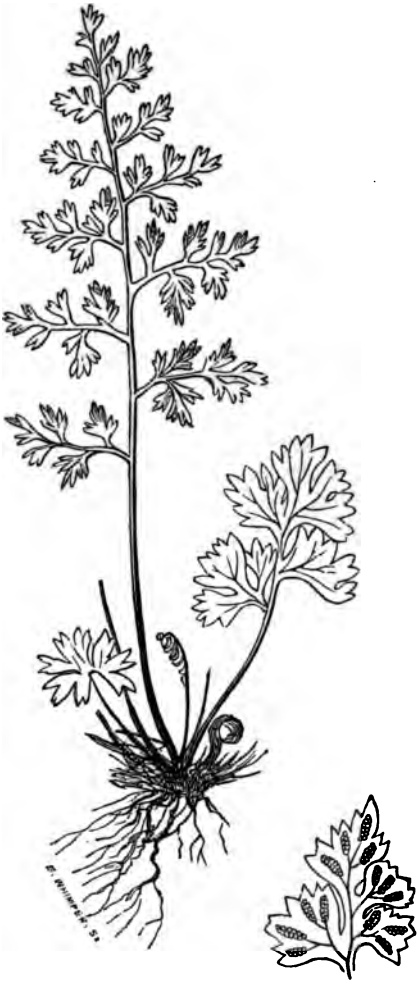
The *root* is thread-like, scaly, black, and far-creeping. The *fronds* strikingly triangular in their outline. Their *stalk* long, stout, green, and smooth, except near the bottom, where there are some scattered brown scales. The *leaflets* are alternate, and occupy only the upper third of the stalk. The lowest pair of leaflets are very much larger than the others, and doubly-leafited; but the *leafits* of the upper pairs of leaflets are only deeply lobed. The lateral veins of the leafits are alternate, and the *fructification* is at the ends of these lateral veins. The masses are circular, numerous, and become very prominent as they ripen. The *membrane* (indusium) is nearly round, forming a hood over the spores, and having its edge jagged.

Mr. Moore observes that—

"The head-quarters in Britain of this very rare and local

Fern are the Highlands of Scotland, where it was found, first on Ben Lawers, one of the Bredalbane mountains, by Mr. Wilson, in company with Professors Hooker and Graham, in 1836; and subsequently by Messrs. Gourlie, Adamson, Borrer, and Little, and Dr. Walker Arnott in 1841, 1850, and 1851, in a ravine called Corrach Dh' Ouflllach, or Corrach Uachdar, between Glen Dochart and Glen Lochay, in the Mhiel Ouflllach mountains in Perthshire. It is reported to have been found in North Wales by Plukenet, and we are informed that the existence of the species in Wales has been recently confirmed, though the information is incomplete; it is not, however, improbable, as the species is met with in the Alps of Europe, occurring most frequently in the north, and generally on rough stony ground. It is also a native of the Rocky Mountains of North America.

"This is strictly an Alpine plant, and requires treatment similar to that recommended for the other species, with perfect rest in winter."



GYMNOGRA'MMA LEPTOPHY'LLA.

GYMNOGRA'MMA LEPTOPHY'LLA.

THIS is the *Polypodium leptophyllum* of Linnæus, but he doubted whether it belonged to that genus, and inclined to think it the link uniting *Polypodium* with *Acrostichum* and *Osmunda*. Decandolle considered it really a species of *Acrostichum*, and other botanists included it in *Anogramma*, *Grammitis*, *Asplenium*, and *Osmunda*. It was united with other species taken from *Acrostichum* and *Hemionitis*, to form the genus *Gymnogramma*, by Desvaux, in 1808. This name, derived from *gymnos*, naked, and *gramma*, writing, alludes to the naked fructification in some species being arranged somewhat like writing in straight lines.

It is an annual, or at most a biennial. Its *root* is a tuft of short, slender, black fibres. Its *fronds* are usually about the height represented in our drawing; but in warm, favourable situations it will sometimes be twice as high. The *barren fronds*, as shown in our drawing, are only half as tall as the fertile fronds; they have from one to three fan-shaped leaflets, variously lobed, and at first resting upon the ground. The *fertile fronds* have a stout, pale brown, glossy stem, the *leaflets* occupy half its length, they are alternate, twice and sometimes thrice leafited, the leafits being also alternate, divided into three lobes, each lobe being two-toothed, so as to be somewhat reversed heart-shaped. A vein passes into each lobe and forks so as to extend a branch into each tooth of the lobe. On these forks, and along

their whole length is the *fructification*. Finally, the spores run together, and usually cover the whole under surface of the leafit.

This has long been known as a native of the southern continent of Europe, its adjacent islands, and Madeira, but it was not until 1852 that it was found to be a native of the British Isles. In that year it was discovered by N. B. Ward, Esq., and others, in the Island of Jersey. It was growing on moist banks having a southern aspect, where *Marchantia* flourishes. Mr. Ward found it in various localities, besides near St. Aubyn's and St. Lawrence. It is not unlikely to be discovered at the back of the Isle of Wight.

Mr. J. Reeve informs us that the *Gymnogramma leptophylla* is well worth cultivating; and although considered quite hardy, will thrive best either in the greenhouse (which seems to suit it as well as any place), stove, or Wardian case. If cultivated in the open air, a sheltered situation should be chosen—sheltered from cold, cutting winds, as well as from the burning rays of the sun, both of which will prove very injurious, if not fatal, to its slender fronds. A warm, shady nook, in a rockery, will, therefore, be the best situation for it In this situation, a free, open compost, of equal parts leaf-mould and peat, with an addition of sand, will grow it well. It must have a moderate supply of water overhead during the season of growth; but such watering must be withheld as the autumn approaches. During the winter months it will require no water, but must have a slight protection if it remains in the rockery out-

of-doors. It may be taken up and potted in the autumn, and placed in the greenhouse for the winter. If grown as a pot-plant for the greenhouse, an addition to the before-mentioned compost of one-fourth loam, with a small quantity of sphagnum, will be preferred, with a good drainage. Frequent syringing, or sprinkling with water, will be required, and still more so if grown in a stove. If grown in a Wardian case, the same compost as for pot culture will be suitable for it, and to be placed near the bottom of the case.

This is one amongst many other Ferns that is suitable for growing under a glass shade or bell-glass by itself, looking very neat, and can be kept in a small room, not capable of accommodating a large case.

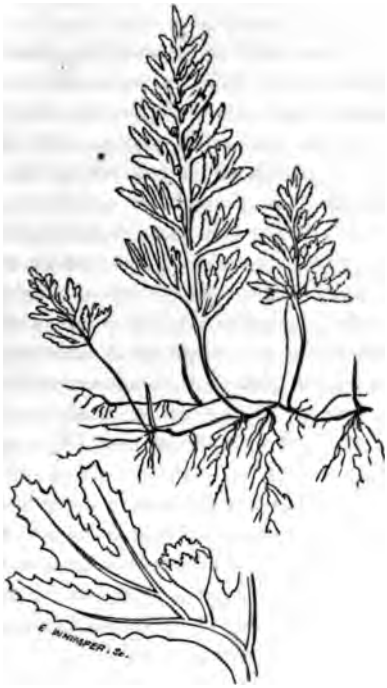
It may be increased by division, or by filling a pot with small lumps of peat and freestone, and sprinkling the surface with the fructification of the Fern when just ripe. Keep the pot in a moist and warm place until the seedlings are up and large enough to finger, when they may be potted into small pots in little lumps, with the growing plants upon them. They must still be placed in a close, shady situation until large enough to plant out finally.

HYMENOPHY'LLUM TUNBRIDGE'NSE.

THIS is popularly called "*The Tunbridge Fern*," but by English herbalists "*The Filmy-leaved Fern*." It was separated from *Trichomanes* by the late Sir J. E. Smith, who erected it into a genus, the striking characteristic of which is pointed out by the name derived from *hymen*, a membrane, and *phyllon*, a leaf.

The *root* is wiry, long, slender, smooth, and black, creeping extensively upon, rather than within the soil, and producing such numerous fibres as to form upon it a kind of turf. *Fronds* solitary, but numerous, rising at intervals along the main roots, erect, from one to three inches high, smooth, deep green, filmy, semi-transparent, curling up as they become dry; leafleted two-thirds of their length; *leaflets* alternate, pointing upwards, variously lobed; the lobes narrow and blunt, chiefly on the upper side of the leaflet, and their edges toothed. The *fructification* is cup-form, nearly stalkless, at the end of a vein, and occupying the place of the lobe nearest the main stalk on the edge of a leaflet; the cover is formed by two slightly convex round leafits, equally toothed, and folding over each other.

This Fern is not uncommon in rocky and mountainous parts of Great Britain, and is there found among moss in moist, shady places. It is very plentiful on various rocks near Tunbridge Wells; in Devonshire, on rocks at Wistman's Wood, Beckley Fall, Dunsford Bridge, and other places; in Yorkshire, rarely at Green-



HYMENOPHY'LLUM TUNBRIDGE'NSE.

field, near Saddleworth, and near Halifax. In Wales, near Cader Idris and Dolgelly. In Ireland, abundantly near the Upper Lake at Killarney, and in the county of Wicklow, at Powerscourt Waterfall, Glencree, &c. Mr. Lightfoot says it occurs frequently in Scotland.

We have given an instance of the life-retentive power of this Fern, when mentioning the similar power possessed by the *Ceterach officinarum*.

This Fern was discovered by Mr. Dare, a botanist of the seventeenth century, and was first mentioned by Petiver in his *Musei Petiverani centuria prima*, published in 1695. Mr. Petiver there calls it *Darea Tunbridgensis minor*, thus commemorating the finder and the place where it was found. In the second edition of Ray's *Synopsis methodica stirpium Britannicarum*, published in 1696, it is stated that "this Fern was first shown to Mr. Ray by Mr. Newton, who, in company with Mr. Lawson, found it on Buzzard rough Cragg, near Wrenose, Westmoreland, among the moss. Dr. Richardson met with it upon moist rocks in Wales, and near Settle, in Yorkshire. It grows on the left hand as soon as you enter the mountains to go to the old castle, near Lhanberis. It was found also plentifully by Mr. Rand, in company with Mr. Sherard, among the pebbles at Cockbush, six or seven miles from Chichester, on the coast of Sussex."

The *Hymenophyllum Tunbridgense* is one of the smallest and most interesting of all the British Ferns, and although we meet with it in its native state, spreading over and flowering interestingly upon the exposed sur-

face of rocks and stone open to the action of all kinds of weather, still, when we attempt to cultivate it, we cannot succeed, unless means are taken to confine a close, moist atmosphere about its little delicate fronds. It prefers being kept continually damp and warm, which renders it a most valuable acquisition to the Wardian case, where it may be grown separately, as also under a plain bell-glass, or may be mixed with others, which likewise prefer a similar situation; but whichever may be chosen for its cultivation, rather more care will be necessary in arranging it than will be required for most other Ferns. The situation it generally chooses for its habitat will be found to be nearly or quite free from all vegetable moulds, and which may be quite dispensed with in pot or artificial culture. Although we have seen it grown very well in equal parts peat and silver-sand, yet we have always found it thrive best under the following treatment.

If to be grown as a pot plant, procure as many shallow pots or deep pans as may be required (from eight to twelve inches wide will be as convenient a size as any, and will grow a nice mass), fill the pot or pan to within an inch-and-a-half to two inches of the rim with small crocks, upon this place half-an-inch of white moss (sphagnum), which press down tight; the pot is then to be filled quite full with powdered sandstone, which is also to be pressed down very firm; upon this a little silver-sand is to be sprinkled, then turn the Fern root upwards, damp the roots, and sprinkle a little sand upon or between them; after that turn the whole over upon

the surface prepared for its reception, sprinkle a little more dry sand over the surface, press it all down together, give it a good watering, and leave it to settle. This is when the Fern is procured in cakes (which may be found several yards square), just like a sheet of wadding. If only a few small pieces can be got, then they must be very carefully spread over the same prepared surface, and imbedded in the sand, pressed down and watered as before. When this is done, a bell-glass must be placed over the whole, so as to fit just within the rim of the pot, and the pot to stand in another pan of water, so that two-thirds of the depth of crocks at the bottom of the pot may be immersed in water; but the level of the water must be below the bottom of the moss.

HYMENOPHY'LLUM WILSO'NI.

This owes its specific name to being first distinguished from *Hymenophyllum Tunbridgense* by Mr. W. Wilson. It is called *H. unilaterâle* by some botanists, in allusion to the lobes of the leaflets being on one side. We believe it to be the variety of *H. Tunbridgense* described by Bolton as having its "fructification on naked fruit-stalks," and which he found on rocks under Dolbadern Castle, near the lake of Llanberris, and on the rock called Foal-foot, on Ingleborough, in Yorkshire.

Root thread-like, brown, slightly scaly, creeping, and producing a few fibrous rootlets. *Fronds* from one to three inches high; stalk stiff, smooth, round, winged at the top. *Leaflets* clothe two-thirds of the stalk, dark green, alternate, bent-back, lobes curved downwards, and spreading horizontally rather than vertically as they do in *H. Tunbridgense;* lobes oblong-oval, sharply toothed, and on the upper side of the leaflet only. *Fructification* is placed as in *H. Tunbridgense*, but unlike that is stalked; its outer case (*involucre*) is egg-shaped, with swollen convex valves meeting at their edges. The fructification curves forward in a direction opposite to that in which the lobes of the leaflets are curved.

In *England* it has been found near the waterfall above Ambleside; at Black Rocks of Great End, in the Scawfell Range, and at Scale Force near Buttermere; and at Greenfield near Saddleworth, and near Silverdale.



HYMENOPHY'LLUM WILSO'NI.

In *Wales* on Snowdon, near Llanberris Pass, and on the adjacent mountains, especially near Twll Du, and on high rocks about Nant Phrancon, and on rocks near the Rhydol at a plank over a gulf of the river Pont Bren. In *Scotland* at Finlarig Burn, near Killin, Perthshire, and in Argyleshire. In *Ireland* at Killarney, Shannafolia Mountains, Kerry Mountains, and Connamara.—(*Francis's British Ferns.*)

Mr. Reeve, writing to us of its culture, says, "The *Hymenophyllum Wilsoni* is very much like the *Tunbridgense*, but of larger growth and stronger habit. Each of the species thrives remarkably well under the treatment directed for the latter; but *H. Wilsoni* is not adapted for artificial rockwork, as a glass of any kind continually kept upon such a structure looks very unnatural; and as it could not be cultivated thereon with any certain success without a glass covering of some kind, it had better be withheld from rockwork altogether. Each of the species thrives remarkably well in the stove or greenhouse, pit or close frame; but whichever situation may be chosen, the plants must be protected from sunshine. They are readily increased by division, by carefully arranging the small pieces on the surface of the compost directed for *H. Tunbridgense*. By keeping the whole close, moist, and warm for a short time, the plants will very soon establish themselves."

LASTRÆ'A CRISTA'TA.

This Fern has been called by botanists *Polypodium cristatum* and *calypteris*, *Polystichum cristatum*, *Lophodium callipteris*, and *Aspidium cristatum*. In English it is called the *Crested Fern*, *Crested Polypody*, and *Crested Shield Fern*.

Root tufted, stout, and far-branching, producing fronds from the ends of each root-branch. *Fronds* yellowish-green, several, and in favourable situations more than two feet high; very erect, and the general outline of the frond line-like, the leaflets very gradually decreasing in length. The leaflets clothe rather more than one half of the *stem*, the lower half of the stem having upon it many scattered, brown, blunt scales, green in front, and channelled, but purple below. The lower *leaflets* are usually opposite, but the upper leaflets are alternate. They are very deeply and regularly lobed, rather than leafited; the lobes are broad, blunt, sugar-loaf shaped, and sharply-toothed round their edge, the teeth ending in short bristles. The side veins in each lobe are much branched, and from the base of each main branch rises the vein, at the end of which is the *fructification*; and its masses, somewhat kidney-shaped, are in two rows, one on each side the mid vein, at a distance equal from that and the edge of the lobe. The cover (*indusium*) of each mass is swollen, permanent, and pale lead-coloured. The masses usually run together by the time the spores are ripe.



LASTRE'A CRISTA'TA.

The *spores* are at first black, but they become rusty as they ripen.

In very luxuriant specimens, and in specimens growing in very shaded situations, this Fern attains a height of even three feet, and the leaflets are wider apart.

This is one of our rarest Ferns. It has been found on boggy heaths, among coarse grass, at the Lows, on Holt Heath; at Fritton, near Yarmouth, in Suffolk, and Surlingham Road, near Norwich, in Norfolk; among Alder bushes, at Westleton, and at Bexley, near Ipswich, in Suffolk; on Oxton Bogs, in Nottinghamshire; in Huntingdonshire; near Madeley, in Staffordshire; and on Wybunbury Bog, in Cheshire. In *Ireland* it has been discovered on the estate of Lord Gough, at Rathronan, near Clonmel.

We believe this to be Dr. Johnson's *Filix mas ramosa pinnulis dentatis*. He says, it then (1633) grew "plentifully in the boggy, shadowy moors near Durnford Abbey, in Sussex, and also on the moist, shadowy rocks by Maple-durham, near Petersfield, in Hampshire; and I have found it often on the dead, putrefied bodies and stems of old, rotten Oaks, in the moors. Near the old plants I have observed very many small, young plants growing, which came by the falling of the seed from their dusty scales; for I believe all herbs have seeds in themselves to produce their kinds. Gen. i. 11 and 12." (*Gerarde's Herbal, ed. by Johnson*, 1129.) Ray, in his *Historia Plantarum*, also says, that Mr. Goodyer had found it not only in Sussex, but in many other places in England.

Mr. W. Reeve gives us the following directions for its cultivation :—

"The *Lastræa cristata* is a very useful plant for adorning the moist, shady parts of the rockery and shrubbery, as well as for growing in pots for a collection of hardy Ferns; but it is not so beautiful as some other species. When once established, it very shortly becomes free in its growth and low in appearance. Those who wish to grow it as a pot-plant must drain well the pot, and give the plants a compost of loam and peat (fibry), equal parts, with a free admixture of silver sand; and plenty of room will be required as the plant increases in size. It prefers being grown in a damp, shady situation, and a cool rather than a hot situation. When grown in a high temperature, the unfolding fronds become long and weak, and it loses its beauty, and oftentimes damps quite off, or dwindles away.

"It is well adapted for damp, shady places, the shaded part of a rockery included, where it will grow very well in a compost of loam and peat, with a little grit (fine stones or small crocks) mixed with it; and both in this, and also under pot-culture, it will require a moderate supply of water and frequent syringing.

"It may be increased by sowing the ripe fructification (which will be in that state by the latter end of summer) in shallow pans filled with charcoal, lumps of peat, sandstone, and loam, and placed in a damp pit, and shaded closely from sunshine, and the seedlings to be pricked off in the same manner as directed for former

genera—always keeping the young plants damp and well shaded, and protected in winter and during the summer months. All the plants in pots should be plunged, or other means taken to keep the roots constantly cool and moist."

LASTRÆ'A DILATA'TA.

THERE has been much "learned dust" raised relative to this Fern, its alleged varieties, and its want of distinct specific characters when compared with *Lastræa spinulosa*. The doubts and "dust" are occasioned, we think, by the admitted fact that *L. dilatata* varies very much in form and stature in accordance with the situation where it grows. It has been called by botanists *Aspidium dilatatum* and *A. spinulosum; Lastræa multiflora; Lophodium multiflorum; Polypodium aristatum*, *P. cristatum*, and *P. dilatatum;* and *Polystichum multiflorum*. In English it is known as *Broad Sharp-toothed Shield Fern; Broad Prickly-toothed Buckler Fern; Broad Prickly Fern; Great Shield Fern;* and *Dilated Shield Fern.*

Root black, tufted, not at all creeping, but large, erect, and almost entitled to be described as tuberous. *Fronds* varying in size from a few inches to two feet, and in very favourable situations twice that heighth; they rise from the root-stock in a circular cluster, and bear some resemblance to the capital of a Corinthian column. They are erect, broad, spreading, light green, and spear-head shaped in their general outline; their leaflets have a similar form, and are so deep cut, or pinnatifid, into long, blunt, parallel, deeply-toothed, sharp-pointed segments, that they seem doubly leafited; indeed, the lower pair are so. The *stem* is slender, slightly scaly throughout its length, but mostly so where there are no



LASTRÆ'A DILATA'TA.

leaflets; the stalks of the leaflets, also, are slightly scaly. The leaflets are rather alternate than opposite, and the leafits are, for the most part, also alternate. *Fructification* numerous, and nearer the midrib than the edge of each leaflet; at first swollen and kidney-shaped, but the cover (*indusium*), when burst, becomes circular, with a deep cut in its lower side.

We have observed how much this Fern varies in form, and the best particulars relative to this characteristic are the following by Mr. Francis:—

"If it grow in a situation which is wet in the spring and dried up in the summer, as on the margin of a pond, it will become var. β, very dark, large, and quite drooping. Continued wet will elongate the leaf and separate the pinnæ and pinnules as in var. γ. A young plant is only twice pinnate and flat. A dry and rocky, or a confined situation will render the leaf small and less divided, the pinnules blunt, deflexed, and drooping: thus starved it becomes the *Aspidium dumetorum* of Smith (var. δ). I know not the nature of the habitats in which the recurved var. (ε) of Bree grows. [It is said to grow both in dry and wet shady places, preferring moisture. But all the recorded localities are in damp climates.—ED.] The varieties *recurvum* and *dumetorum* are, I believe, not altered by cultivation, and Sir J. E. Smith implies, in his description of the latter, that its spores produce the same variety.

α (*dilatatum*). Frond sub-tripinnate, triangular, ovate. Pinnules petioled.

β (————). Frond tripinnate, deflexed, triangular. Pinnules convex.

γ (————). Frond tripinnate, triangular, elongated. Pinnules somewhat decurrent, and distant from each other.

δ (*dumetorum*). Frond small, triangular, drooping. Pinnules blunt.

ε (*recurvum*, Bree). Frond small. Pinnules *concave*, and dark green, *Newm.* p. 61. Lastræa Fœnisecii, *Bab.* Lophodium Fœnisecii, *Newm.* 1854."

We only differ from Mr. Francis in considering that *L. Fœnisecii* is a distinct species, and not merely a varied form of *L. dilatata.*

It is found in shaded, watery, sandy soils, or in moist, rocky woods, and is so common that no locality need be specified.

Mr. W. Reeve observes to us that this, also, is one of those Ferns which are valuable for the adorning of the rockery or shrubbery, and will be found to thrive where the *Lastræa cristata* will not, being not so impatient of sunshine; not but that it will attain a greater size and more beauty, when grown in the shade, than when grown in a full exposure to light. It is, therefore, well adapted to the shaded side or base of the rockery; and as it will, when once established in a favourable situation, attain a heighth of three or four feet, forethought will be required in planting, so that it may not smother the smaller species. It prefers a moist situation for its abode, but will grow remarkably well upon an elevated position that is well shaded. If grown as a pot-plant, it must be allowed a moderate space for its roots; and with a compost of loam, peat, and leaf-mould, with a free admixture of silver sand and good drainage, not being potted too firmly, and afterwards, a

moderate degree of shade and a good supply of water being given both at the root and over-head, it will be found to have had its wishes met. If grown upon the rockery or in the shrubbery, it will prefer more loam and less leaf-mould; and if placed in an exposed situation, it must be shaded until established, when it may be gradually exposed to meet all weathers. It will not require any protection in winter, unless grown in pots, or upon very exposed parts of the rockery, where a slight protection will be preferable. It is not suitable at all for the Wardian Case, nor for in-door culture, as the confinement makes it weak. The propagation may be pursued in a similar way to that mentioned for *Lastræa cristata*.

LASTRÆ'A FI'LIX-MAS.

This has been called by various botanists a *Polypodium*, an *Aspidium*, a *Polystichum*, and a *Dryopteris;* but in every instance they adopted the specific name, *filix-mas*, because it is the acknowledged "Male Fern" of our most ancient herbalists. *Male Fern* is its most generally admitted English name; but it has also been called *Male Polypody*, *Male Shield Fern*, and *Common Buckler Fern.*

Root black, tufted, scaly, large, with numerous dark brown, deeply-penetrating rootlets. *Fronds* several, rising in a circle, erect, from two to four feet high. The general outline would be spear-head-shaped, if the lowest pair of leaflets were not much shorter than those next above them, rendering the form more ovate, but pointed. Less than a fifth of the stem is without leaflets, but this unleafleted portion is covered with a profusion of chaffy scales, which extend, indeed, over the entire stalk and mid-ribs. *Leaflets* alternate, very equal in width until near their end, when they rapidly taper to a point. *Leafits* oblong, blunt, roundish-toothed, numerous, crowded, stalkless, for the most part distinct, but sometimes rather united at the base; both surfaces smooth, but there is an indent on the upper surface, over the place where is each mass of fructification. *Fructification* in circular masses, tawny, ranged closely in short rows near each side of the lower half of the mid-rib of each leafit; cover (*indusium*) kidney-shaped,



LASTRÆA FILIX-MAS.

durable, scolloped, swollen, with a cleft terminating in the centre. *Spores* numerous, shining brown, prominent, round, and just beyond the edge of the cover.

Three varieties of this Fern occur, and have been thus well particularised by Mr. Charles Johnson:—

"1. *incisa*. Frond robust, broadly lanceolate; pinnæ distant; pinnules distinct, elongate, narrow, acuminate, deeply incised, the lobes serrated. Sori extending nearly the entire length of the pinnules. Lastrea Filix-mas, β. incisa, *Moore, Handbook Brit. Ferns*, 50. Aspidium Filix-mas, β. erosum, *Hooker and Arnott*. Dryopteris affinis, *Newman, Hist. Brit. Ferns*, 187.

"2. *abbreviata*. Frond small, lanceolate, pinnate. Sori confined to the base of contracted or obsolete pinnules, forming a linear series on each side of the mid-vein of the pinnæ. Lastrea Filix-mas, β. abbreviata, *Babington*. Polystichum abbreviatum, *De Candolle*.

"3. *Borreri*. Frond narrow lanceolate. Rachis clothed with ruddy-golden scales and hairs. Sori few, large, two or three pairs at the base of each pinnule. Dryopteris Filix-mas, var. Borreri, *Newman, Hist. Brit. Ferns*, 189.

"Of these, the variety *incisa* is far from uncommon; *abbreviata* has been found on Ingleborough, Yorkshire, on the basaltic cliffs of Teesdale, and in the Peak district, Derbyshire, everywhere apparently in dry localities; *Borreri* seems to be common, though first observed by Mr. Borrer, in Devonshire, as a variety 'with more copious and brighter-coloured scales on the rachis, and with a bright golden-yellow tinge on the whole frond.' *Brit. Flora*.

"*Abbreviata* retains its distinguishing features in all soils and under different treatment in cultivation, and may perhaps eventually prove a separate species." (*Sowerby's Ferns.*)

This is too common a Fern to require the places

where it is found to be particularised; indeed, the difficulty would be to find any wide-extended district where it could not be discovered.

Mr. W. Reeve observes upon this Fern, that it is a most desirable plant for furnishing the rockery and vacancies and corners in the shrubbery, and other similar places. A few hints may not be out of place for its culture. It is one of the finest growing of the British species, and one that will make a noble object when once established. The treatment it requires is merely a moderate space for its roots, in a compost of sandy loam three parts, with one part of leaf-mould, and a free supply of water during its growing season. This compost will suit it for either pot culture or for cultivating it in the open air. When growing in pots, these had better be plunged in some loose substance during the winter months. It may be increased very freely from seeds, which will be in a perfect state soon after Midsummer. Like many other Ferns, this will look much nobler when planted out in the spring. If planted in mass upon an irregular surface, say from six to eight strong plants in a clump, with a few large white flints or pieces of rock laid in between and about them, it will add to the appearance. Although this Fern will stand a little sun, yet it flourishes much better in the shade.

Although some medical practitioners have no faith in this Fern as a destroyer of worms in the human intestines, yet other authorities maintain that it is the most powerful medicine we possess for that purpose,

and it was so esteemed by some of the most ancient physicians.

"Dr. Peschier, of Geneva, found that sulphuric ether extracted the active principle of the Fern. The solution, left for some time at rest, yielded a mamellated substance, which, on being freed by pressure from the liquid with which it was impregnated, was found to be an adipocire. The liquid was, in consequence of its separation, thinner, had a greenish-brown colour, a disagreeable taste without being acrid, a nauseous smell, and reddened litmus paper. By further analysis the whole products of the Fern are, adipocire, a brown resin, an aromatic volatile oil, an aromatic virose fixed oil, a green colouring principle, a reddish-brown principle, extractive, muriate of potash, and acetic acid.

"The root was used as an anthelmintic in the days of Dioscorides. It gradually became neglected, but its use was again revived, at different times, by Madame Nufier, Ferrenschwand, and others, who frequently succeeded in killing and expelling the tape worm by the exhibition of secret remedies, of which the Fern powder was the principal ingredient. To kill a tœnia, about three drachms of the powder of Fern are required. Dr. Peschier found that this quantity yielded three drops of oil, or twenty-four grains. This may be made into pills, or mixed up in the form of an emulsion; and as it is necessary to be given when the stomach is as empty as possible, one half may be given at night, and the other half in the morning, on the empty stomach. It is immaterial whether a purgative be given with it or not. By this method Dr. Peschier assures us, that he had succeeded in 150 cases of tœnia. Others have also given information; and M. Studer expelled, in one case, Tricocephalus dispar of Bremser, which resists all other known anthelmintics." (*Duncan's Edinburgh Dispensatory.*)

The above is not the only use to which this Fern is applied, for the Siberians are fond of the flavour which it imparts to ale, and its ashes contain so much potash as to be especially valuable to the soap and glass-maker. In Norway the young fronds, before they uncurl, are boiled and eaten like Asparagus, and in hard winters the dried fronds are there soaked in hot water and given as fodder to cattle.

The superstitions of old connected with this Fern very widely prevailed, and have been rendered classical by Shakspeare and other writers. "This Ferne," says Lyte in his *Herbal*, published in 1578, "beareth neither flowers nor seede, except we shal take for seede the blacke spottes growing on the backside of the leaves, the whiche some do gather, thinking to work wonders, but to say the trueth, it is nothing els but trumperie and superstition." Bauhin, writing in 1650, in his *Historia Plantarum*, says, "These black spots fall about the festival of St. John (June 25), and are collected by certain women and sold as *Fern-seed*. I will not relate the follies and superstitions practised with this seed."

"'Fern-seed,' says Grose, 'is looked on as having great magical powers, and must be gathered on Midsummer Eve. A person who went to gather it reported that the spirits whisked by his ears, and sometimes struck his hat and other parts of his body; and, at length, when he thought he had got a good quantity of it, and secured it in papers and a box, when he came home he found both empty.' [Bovet, in his Pandæmonium, 1684, gives a narrative of some ladies who say, 'We had been told divers times that if we fasted on Midsummer Eve, and then at 12 o'clock at night laid a cloth

on the table with bread and cheese, and a cup of the best beer, setting ourselves down as if we were going to eat, and leaving the door of the room open, we should see the person whom we should afterwards marry come into the room and drink to us.'] Torreblanca, in his Dæmonologia, 1623, p. 150, suspects those persons of witchcraft who gather Fern-seed on this night: 'Vel si reperiantur in nocte S. Joannis colligendo grana herbæ Fælicis, vulgo Helecho, qua Magi ad maleficia sua utuntur.'

"A respectable countryman at Heston, in Middlesex, informed me in June, 1793, that, when he was a young man, he was often present at the ceremony of catching the Fern-seed at midnight on the eve of St. John Baptist. The attempt, he said, was often unsuccessful, for the seed was to fall into the plate of its own accord, and that too without shaking the plant.

"Dr. Rowe, of Launceston, informed me, Oct. 17th, 1790, of some rites with Fern-seed which were still observed at that place. 'Fern,' says Gerard, 'is one of those plants which have their seed on the back of the leaf, so small as to escape the sight. Those who perceived that Fern was propagated by semination, and yet could never see the seed, were much at a loss for a solution of the difficulty; and, as wonder always endeavours to augment itself, they ascribed to Fern-seed many strange properties, some of which the rustick virgins have not yet forgotten or exploded.' This circumstance relative to Fern-seed is alluded to in Beaumont and Fletcher's Fair Maid of the Inn:

——— 'Had you Gyges' ring?
Or the herb that gives Invisibility?'

"Again, in Ben Jonson's New Inn;

——— 'I had
No medicine, sir, to go invisible,
No Fern-seed in my pocket.'*

* ["Gather Fearne-seed on Midsomer Eve, and weare it about the continually. Also on Midsomer Day take the herb Milfoile roote before

"Again, in Philemon Holland's Translation of Pliny, book xxvii. ch. 9: 'Of Ferne be two kinds, and they beare neither floure nor seed.' The ancients, who often paid more attention to received opinions than to the evidence of their senses, believed that Fern bore no seed. Our ancestors imagined that this plant produced seed which was invisible. Hence, from an extraordinary mode of reasoning, founded on the fantastic doctrine of signatures, they concluded that they who possessed the secret of wearing this seed about them would become invisible. This superstition Shakspeare's good sense taught him to ridicule. It was also supposed to seed in the course of a single night, and is called, in Browne's Britannia's Pastorals, 1613,

'The wond'rous one-night-seeding Ferne.'

"Absurd as these notions are, they were not wholly exploded in the time of Addison. He laughs at a doctor who was arrived at the knowledge of the green and red dragon, and had discovered the female Fern-seed." (*Tattler*, No. 240. *Brand's Popular Antiquities.*)

Not only were these superstitions not exploded in the time of Addison, but they linger still in some of the rustic corners of our land. Thus Mr. Edwin Lees, in his recent work, "Pictures of Nature in the Silurian Region round Malvern Hills," says:—

"The country-people in Worcestershire, as my antiquarian friend Mr. Jabez Allies informs me, still traditionally keep up the old belief in the mystic powers of the 'Fern-seed,' which was supposed to make the gatherer 'walk invisible.' The saying is, that the Fern blooms and seeds only *at twelve o'clock on Midsummer night;* and to catch the seed

sun-rising, and before you take it out of the ground say these words following, &c., and gather the Fern-seed on Midsomer Eve betweene 11 and 12 at noone and at night." MS. temp. Eliz.]

twelve pewter-plates must be taken. The wondrous seed, it is affirmed, will pass through eleven of the plates, and rest only upon the twelfth! Such an idea may now be smiled at; but the philosophers of a past age believed something very similar, and even taught that demons watched to convey away the Fern-seed as it fell, ere any one could possess themselves of it. To 'walk invisible' was said, and at one time believed, to result from possessing the Fern-seed."

LASTRÆ'A FŒNISE'CII.

THE specific name, from the Latin *fœnum*, hay, refers to the smell emitted by this plant, but that smell differs so little from the smell of other species that we agree with Mr. Charles Johnson in wishing that the specific name of *recurvum*, given it by some botanists, had been more generally preferred, for *recurvum*, curled-back, well points out the peculiarly crisped appearance of this Fern.

It has been called *Aspidium dilatatum* var. *concavum; Aspidium recurvum; Aspidium spinulosum*, var.; and *Lophodium fœnisecii*. In English it is the Hay-scented Buckler Fern, and Recurved Prickly-toothed Fern.

Root large and tufted, rootlets numerous. The *Fronds* rise from the tuft in a circle; they are bright pale green, with the leaflets very much curled, or crisped upward, rendering their upper surface concave. The stem curves downward gracefully, the lower half being without leaflets, but thickly clothed with pale, semi-transparent scales; these scales are long, narrow, and usually jagged. The general outline of the leafleted portion is a long triangle. The *leaflets* in full-grown plants are constantly three-leafited (tripinnate) at the lower part of the frond, and of the lower leaflets generally; the leafits and lobes of the upper parts of the leaflets are all finely toothed, each tooth ending in a short spine, giving it a crisped, irregular, yet graceful appearance, which, combined with the concave form of the leaflets, enables it at once to be identified. On the under



LASTRÆ'A PŒNISEC'II.

surface of the leaflets are numerous stalkless glands, producing the secretion which gives forth the hay-like smell to which we have already alluded. The *fructification* is regularly scattered over the under surface of each leaflet, each mass being covered with a roundish kidney-shaped membrane (*indusium*), having a jagged edge, and sometimes having on the edge a few of the glands just noticed.

This Fern is not generally found in the British Islands, but it occurs abundantly on the western side of *England*, as in Cornwall and Devon, and less plentifully in Somersetshire, Sussex, and Cumberland; at Ripon, Settle, and Scarborough, in Yorkshire, and in North Lancashire. In *Wales*, in Anglesea, Glamorganshire, and Merionethshire. In *Scotland* it is found in the East and West Highlands, and in the Northern and Western Islands.

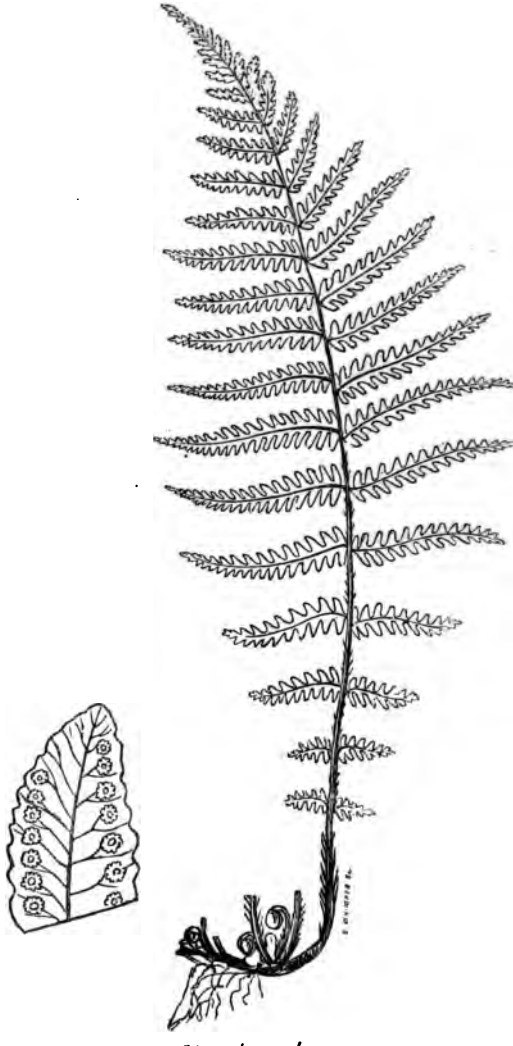
It occurs sometimes in dryish situations, but is usually found in moist, sheltered, woody places, and on the banks beneath hedges.

We think that this Fern was first discovered and particularised by Dr. Johnson, the editor of the second edition of "Gerarde's Herbal," and that in that work (page 1130) he describes it as "the Male Fern not branched; with narrow, separated, deeply-toothed leafits" (*Filix mas non ramosa pinnulis angustis, raris, profunde dentatis*). Be this as it may, his namesake, Mr. Charles Johnson, says, "In 1821, I first noticed it in the vicinity of Dolgelly, and again in the Vale of Festiniog (in Merionethshire and Glamorganshire), and

though marking its peculiarity, supposed it, in my inexperience, to be a form of *Aspidium dilatatum* of Smith. It had not then received name or notice among recent botanists, though, apparently, referred to both by Ray and Plukenet; nor was my attention directed to its very distinct character, even as a variety, until, in 1831, the Rev. W. T. Bree described it in the 'Magazine of Natural History,' under the name of *recurvum*, since which time opinion has been divided respecting its claim to rank as a species."—(*Sowerby's British Ferns.*)

Mr. Reeve, writing to us relative to its cultivation, says:—

"*Lastræa Fœnisecii* is, perhaps, of all the *Lastræas*, the most elegant in shape, and, producing as it does many distinct forms, is well worth cultivating. It is of such easy culture, that it should not be absent from any collection. It will, in the shade, unfold its fronds to the length of three feet, and produce them rather abundantly, making, together, a very noble object; but in proportion as it is exposed to the sun, so it becomes less luxuriant in habit, and also less in the number of its fronds. It may be grown in almost any degree of shade, from the Fernery or shrubbery, excluded from the sun altogether, to a situation exposed to all its rays; but, as I have said, much beauty will be lost according to the degree of exposure to light which it has to endure. It may be grown in sandy loam, with a little leaf-mould; or, in default of leaf-mould, in most cases, a few very rotten sticks broken into small pieces will form a very good substitute. The fructification (which will be in a ripe state towards the end of the summer) may be employed for its propagation, proceeding in the same way as directed for other species. The plants, if grown in pots, will require to be plunged in winter."



LASTRÆ'A OREO'PTERIS.

LASTRÆ'A OREO'PTERIS.

THIS has been called by botanists *Aspidium odoriferum*, *A. oreopteris*, *Hemestheum montanum*, *Lastræa montana*, *Polypodium fragrans*, *P. oreopteris*, *P. thalypteris*, *P. montanum*, and *Polystichum montanum*. In English it is known as the Mountain Fern, Heath Fern, Mountain Buckler Fern, Heath Shield Fern, and Heath Polypody. The uniform reference in these names to "Mountain" and "Heath" indicates the places which it frequents.

Root, large, black, scaly, and tufted; with numerous stout, matted rootlets. *Fronds* several, growing in a circle, between two and three feet high, erect, spear-head shaped in general outline. *Stem* covered with fine hairs on the upper part, and slightly with pale brown scales at the bottom; pale green and deeply channelled in front. *Leaflets* extending nearly to the bottom of the stalk, almost opposite, stalkless, deeply lobed, so as nearly to form leafits; lobes bluntly pointed, smooth, except the midrib, which is downy. Underside sprinkled with shining, yellowish, resinous globules, yielding a grateful scent. *Fructification* in a row near the edge of each lobe, and when ripe the round masses nearly run together, forming a brown beaded line close to the edge. The cover (*indusium*) of each mass is thin, white, kidney-shaped, but almost circular, and soon shrivelling up.

It is usually found upon mountain heaths, but it has been found also in shady woods, where the soil is moist.

In *England* it has been gathered at Old Foot's Well, Bromsgrove, in Worcestershire; near Chapel Weardale and Darlington, Durham; at Cawsey Dean, near Newcastle; at Keswick and near Lodore Waterfall, in Cumberland; by the Tees; near Richmond, and in woods at Castle Howard, in Yorkshire; on Coleshill Heath and Corley, in Warwickshire; near Warrington; on Dethick Moor and near Riley, in Derbyshire; in the Isle of Man; on Dallington Heath, near Northampton; on the north side of Shotover Hill, in Oxfordshire; on Oxton and Eddingley Bogs, in Nottinghamshire, and at Hartswell, near Farnsfield; at Conham and Leigh Woods, near Bristol, in Somersetshire; at Bradwell, in Suffolk; in Sussex; on Bailey's Hill, between Brasted and Tunbridge, in Kent; and near Southampton.

In *Scotland*, at Glen Isla, in Forfarshire; in Sutherlandshire; on the banks of Loch Tay; in Aberdeenshire; and at the foot of Craig Chailleach.

In *Wales*, near Wrexham, in Denbighshire; at Llanberris and Nant Gwynedd, in Caernarvonshire.

In *Ireland*, in Powerscourt Deer Park, and Waterfall, Mangerton Mountain; Lough Corril, in Galway; and elsewhere.

This very beautiful and easily distinguished Fern is first mentioned by Ray as a native of this country. He notices it in the Appendix to the second edition of his *Synopsis Methodica Stirpium Britannicarum* as "a variety of the common Male Fern observed by Petiver on Dunsmore Heath, near Rugby, in the county of Warwick;"

and then proceeds to describe it, and to state that it had been mentioned by Plukenet.

Mr. Reeve observes, in a letter with which he has favoured us, that this is a very elegant and useful Fern for growing in pots, or on rocks and other scenery, when successfully cultivated. Although rather shy of being removed, yet, with a little care, it may be successfully treated. We find with this, as with many other plants or Ferns that are rather impatient of moisture remaining about their roots, that they do not like to have the roots disturbed; therefore those who would like to cultivate this Fern should obtain it either in a young state from its native place, or a well-established plant in a pot from a nurseryman, to be planted or potted in a compost of two-thirds fibry peat and one of leaf-mould and sandy loam in equal parts, with a free admixture of silver sand. The pots must be carefully and well drained. Place one large crock or oyster-shell over the hole at the bottom of the pot; then place over this, according to the size of pot to be used, a quantity of small crocks, and above this place a little sphagnum, just sufficient to cover the crocks. The potting may then be carried out in the usual manner, potting rather firmly. Afterwards great care must be taken to see that the Fern does not have too much water, for it is very impatient of excessive moisture. For the rockery or shrubbery it must also have a well-drained situation, or it will not succeed; and also a shady place will be required. The same compost will do for this as for pot-culture, and, whether in the rockery or in pots, a slight sprinkling with the

syringe or very fine-rosed pot will be found preferable, during fine growing weather, to the application of water to the roots alone. It is well adapted for either the rockery or shrubbery, and would look much better if planted in masses in the shrubbery in the same manner as mentioned for former species. It may be propagated by division, although with some difficulty, but with more certainty from the mature fructification, which will be ripe by the end of the summer months, and which may be sown and treated in the same way as mentioned for other species.



LASTRE'A RI'GIDA.

LASTRÆ'A RI'GIDA.

This has been called *Aspidium rigidum*, *A. fragrans*, and *A. spinulosum*, *Lophodium rigidum*, *Polypodium rigidum*, *Polystichum rigidum*, and *P. strigosum*. It is probable, also, that it has been confounded with the *Polypodium fragrans* of Linnæus. It is in English the Rigid Buckler Fern, Rigid Shield Fern, and Rigid Lastræa.

Root thick, slowly-extending, tufted, with many long, wiry rootlets. *Fronds* numerous, in a tuft, varying, according to the situation, from half a foot to more than two feet in height. The *stem* of each frond is thick and stiff, or rigid, whence the specific name; its lower third is without leaflets, but thickly covered with reddish-brown, sharp-pointed, membranous scales; these scales extend up the leafleted part. General outline of the leafleted portion a lengthened irregular triangle. Upper *leaflets* alternate, but lower ones nearly opposite; their stalks much thickened where they join the stem; the leafits are oblong, blunt, variously but deeply lobed; lobes with from two to five sharp teeth, but not ending in a spine, with the branch of a lateral vein passing into each tooth. *Fructification*, mostly at the upper part of the frond, is at the first fork of each lateral vein of the leafit bearing it, and so forming a row on each side the mid vein; running together (confluent) when ripe; the cover (*indusium*) kidney-shaped, and attached to the lateral vein by a short stalk at the indentation of its kidney form, white at first, but afterwards leaden-coloured. This cover

is beaded round with stalked globular glands. Similar glands are scattered over the frond's whole surface, and they emitting a rather agreeable odour, have caused it sometimes to be called *fragrans*, and, consequently, to be confounded with *L. oreopteris*.

It is almost confined to the limestone mountains of the north of England, where it was first noticed as a British Fern by the Rev. Mr. Bree. He discovered it at Ingleborough, in 1815. Since then it has been found at Whornside; at Settle; at Arnside Knot, near Silverdale, in Westmoreland; and on White Scars, above Ingleborough. A single plant was found near Bath, and another at Louth, in Ireland, but in such situations as to justify the opinion that they were introductions.

Mr. W. Reeve tells us that this Fern is a free-growing species under cultivation, and is a very elegant ornament for the well-drained and shady parts of the rockery. It being found growing wild generally upon chalky soils, and oftentimes upon elevated positions, points out it is well adapted by its native habit for planting on artificial rockwork. It may be grown, also, successfully in shrubberies and wildernesses, where a thorough drainage can be procured, and also shade, in which it delights, although it will bear exposure, but the beauty of the plant is then lost. It will also succeed well under pot-culture, and to thrive it should have a well-drained soil, composed of turfy peat two parts, and one part sand or limestone broken into small pieces, and a free admixture of silver sand; old mortar, broken small, forms a very good substitute for the third part. The same com-

post will suit it for either pot or rock culture; but whether cultivated in pots or upon rockwork, it must be so placed that, whilst freely supplied with water at the roots and over the foliage (which it will require during the growing season), all excess of water may soon drain away, so that the moisture should never become stagnant about the roots. Although the present species often grows in situations where it is subject to a considerable degree of dryness and exposure to the sun, yet it may, under cultivation, be grown to a much finer state of development if kept moist and shaded during its growing period. Young plants are the best to start with. Proceed with potting and propagating in the same manner as directed for former species, the fructification being ripe by August or September.

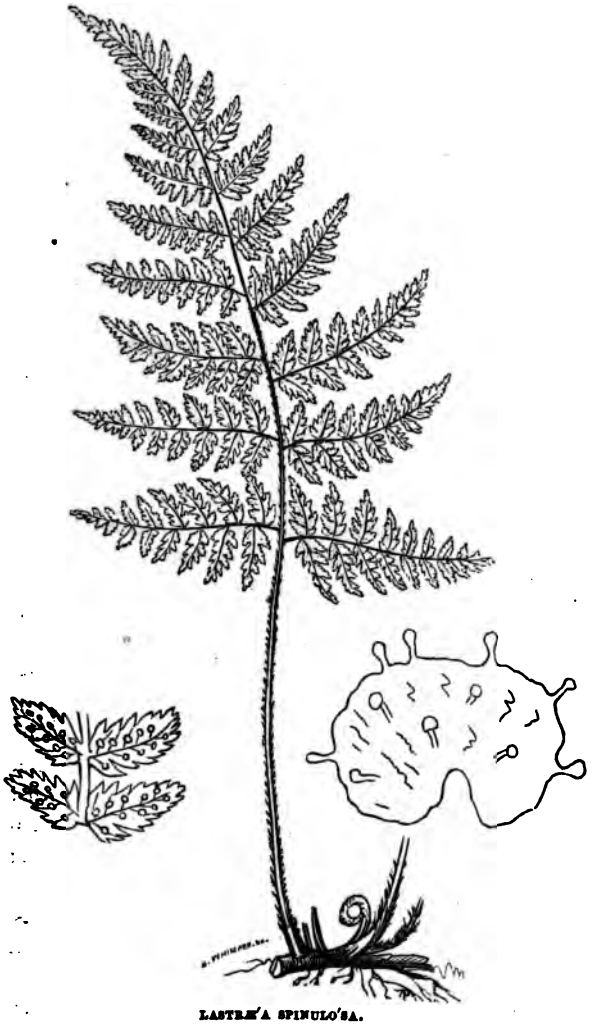
It may be grown in-doors, although, like most of the other *Lastræas*, it usually becomes long and weak under confined treatment; but this may be checked if it can be supplied with abundance of fresh air.

LASTRÆ'A SPINULO'SA.

THIS is described by some botanists under the names of *Aspidium spinulosum*, *Lastræa dentata* var. *linearis*, *L. spinosa*, *Lophodium spinosum*, *Polypodium cristatum*, *P. filix-fœmina* var. *spinosa*, *P. dentatum*, *P. spinosum*, and *P. spinulosum*, and *Polystichum spinosum*. In English it is called the Narrow Prickly-toothed Fern, Prickly Shield Fern, Lesser Crested Polypody, and Prickly-toothed Shield Fern.

This species has been confounded with a variety of *Lastræa dilatata* by Sir J. E. Smith and others.

Root rather creeping, and although spreading slowly, yet in old plants it reaches to a distance, and sends up numerous tufts of fronds. *Fronds* a delicate light green, varying from one to three feet high, very slightly leaning, having a long triangular general outline, and perfectly flat. The *stem* whitish, with a few black dots, through half its length without leaflets, and this unleafleted part is beset with thin, semi-transparent, pale brown, oval scales, slightly pointed. *Leaflets* not crowded; *leafits* numerously and deeply cut, spear-head shaped, all deeply toothed, each tooth ending in a sharp hooked point, and a branch of a lateral vein passing into each tooth. The lower leafits on each leaflet are often larger than their corresponding upper leafits. *Fructification* on the first inner branch of each lateral vein, forming a row of circular masses on each side the *mid-vein*. The masses are small; the cover of each



LASTRE'A SPINULO'SA.

flat, kidney-shaped, slightly waved on the edge, but never fringed with glands. In exposed situations the masses sometimes run together. The fructification is generally, but not always, upon the upper leaflets of the fronds only.

It is found in marshy places, moist wooded ground, and wet hedgerows.

In *England* it has been found in the Isle of Man; near Ingleborough, Pottery Car at Doncaster, and Richmond, in Yorkshire; Woolston Moss, in Lancashire; Newchurch Bog, in Cheshire; Titterstone Clee Hills, and Bomere Pool, in Shropshire; in Warwickshire; in Derbyshire; Dallington Heath, near Northampton; in Norfolk; near the Windmill and the Spring-well on Wimbledon Common; in Sussex; at Tunbridge, in Kent; near Torquay, and in a wood near Dunsford Bridge, in Devonshire.

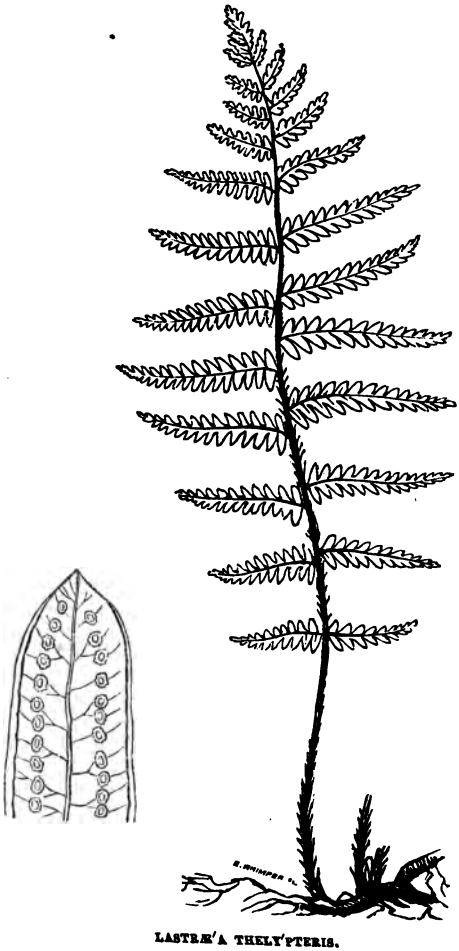
In *Scotland* at Brahan Castle, near Dingwall. We are not sure about other localities where it has been said to be found.

Mr. Reeve observes to us, that although the *Lastræa spinulosa* may, at first sight, be mistaken for *L. dilatata*, yet, when each of them is cultivated in one collection, there will be found a marked difference. Neither of the species should be absent from a collection, for although a similarity exists, both the distinctness and beauty of each will be very apparent when growing near to each other.

This is a very fine and erect-growing species, and remarkably well adapted for the moist parts of the

Fernery, rockery, or shady parts of the shrubbery, and from its bold, free habit, should be largely cultivated. It will bear a moderate degree of exposure, although, like most others of the genus, it prefers shade, attaining greater magnitude according to the degree of shade it is grown under; but, whichever situation it may occupy, a good supply of water will be necessary.

It is a Fern that will make itself at home under ordinary attention, and may be very confidently trusted to repay its cultivator with the expansion of its noble fronds for much less care and trouble than is necessary for many of the British Ferns. It is also a very nice-looking plant when cultivated in pots, which may be easily done. The principal points are, a good supply of water and good drainage, with allowance of space for the roots as the plant increases in size. A compost of equal parts loam and peat, with an admixture of sand sufficient to keep the soil open, will meet its wishes in any situation. Let it be potted rather firmly, but not hardly. The propagation is as directed for former species, by division or by its fructification.



LASTRÆ'A THELY'PTERIS.

LASTRÆ'A THELY'PTERIS.

THIS has been called by different botanists *Acrostichum*, *Aspidium*, *Athyrium*, *Hemestheum*, *Polypodium*, and *Polystichum*; but they all agree in giving it the specific name of *Thelypteris*, which is literally the Woman or Lady Fern. In English it is known as the Marsh Shield Fern, Marsh Polypody, and Marsh Fern.

Root widely creeping, by means of slender, blackish, thread-shaped, smooth, or slightly downy runners. From various points in these arise irregularly the *fronds*. These are erect, delicate, deep green, usually smooth, but occasionally slightly hairy. The barren fronds are about one foot high, but the fertile fronds vary from two to four feet in height. Their *stem* is slender, and mostly naked, but sometimes slightly scaly, and the lower half without *leaflets*. These, especially when barren, grow markedly horizontally, are narrow spear-head shaped, deeply and regularly pinnatifid, partially opposite, but mostly alternate; the barren segments blunt, and slightly scolloped; the fertile segments narrower, more pointed, with the edges rolled back. The mid-vein zigzagged, and sometimes very hairy. The lateral veins divide into two branches about half-way between the mid-vein and margin of the segment, and on the fertile fronds each branch of the lateral veins bears a small round mass of the *fructification*. Each mass is dark brown, at first covered by a thin, white, torn, kidney-shaped cover (*indusium*), fixed by the

centre, but which soon is elevated and shed. The masses eventually run together into lines, and sometimes nearly cover the segment.

It is found in boggy meadows and marshes, especially where the soil is gravelly, but is rare, and though found in different parts of the British Islands, is very local. It is more common in Scotland than in England or Ireland. In *England*, on Learmouth Bogs, in Northumberland; near Settle, in Yorkshire; at Allesley, in Warwickshire; on Knutsford Moor and New Church Bog, near Over, in Cheshire; on Oxton Bogs, in Nottinghamshire; in Windsor Park and Sunning Hill Wells, in Berkshire; in the valley below Cæsar's Camp, on Wimbledon Common; and on Leath Hill, in Surrey; in a bog on Waterdown Forest, near Tunbridge Wells; at Belton, and near Bungay, in Suffolk; at St. Faith's, Newton Bogs, near Norwich; and in Somersetshire and Sussex. In *Wales*, in a moist dell at the foot of Snowdon, near Llanberris; on the border of the lake near Red Wharf; and at Beaumaris, in Anglesea. In *Ireland*, on the marshes at Glencree, in Wicklow, and at Neveruss, Killarney.

This Fern was first noticed as an English plant by Ray. He mentions it in his *Synopsis Methodica Stirpium Britannicarum*, as the *Filix minor palustris repens*, Creeping Water Fern, or Lesser Marsh Fern.

Mr. Reeve informs us that the *Lastræa thelypteris* will be found to thrive pretty well under pot-culture, and with ordinary care will become a very elegant object. Being one of those Ferns which choose a marshy place

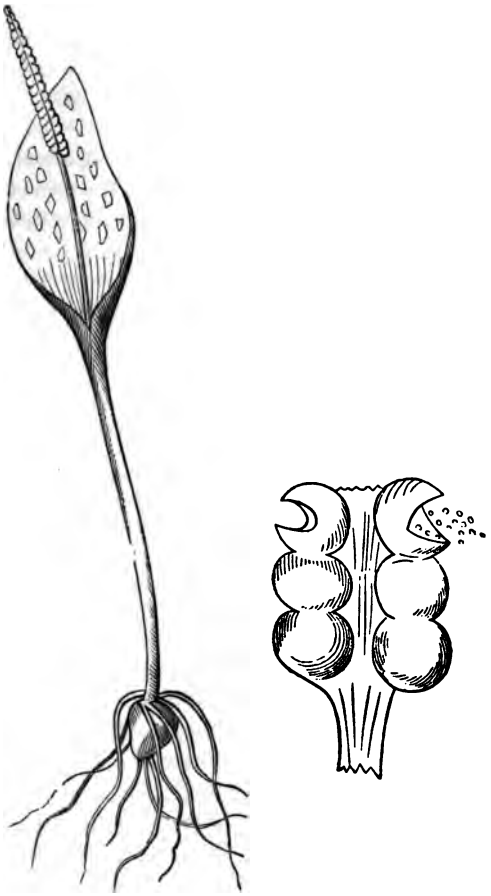
for their natural habitation, it will be found very useful for planting upon the base of the rockery, where, when once established, it will soon spread and show its beauty, for, when seen in a mass, it is a very handsome Fern. It produces its fertile fronds, which are the finest, in much greater abundance where it has full scope for its roots, delighting as it does in being permitted to creep about where it chooses. It may, however, be treated very successfully under pot-culture; but, as it will be seen, from its creeping nature, a pan will be far better to grow it in than any other vessel, as it does not require depth so much as surface-room. The drainage in the pan must be formed by a layer of crocks at the bottom, then a layer of coarse, fibry peat, filling half the depth of the pan, and the remainder with a compost of two-thirds turfy peat, and one-third of leaf-mould, with a free admixture of silver sand, and a few pieces of crock broken very small. In this compost, with a free supply of water, the plant will flourish as if at home. The same compost will suit it for planting out. It may be propagated easily by division, and may be grown also under glass. The plants in pots or pans will require a slight protection through the winter.

Some botanists have considered as species, and even as belonging to a new genus, forms of Ferns which, we believe, are only varieties of the species of *Lastræa*, which we have particularised. Thus *Aspidium dumetorum*, *Lophodium glandulosum*, and *Lophodium collinum*, we consider varieties of *Lastræa dilatata*, and *Lophodium uliginosum* of *Lastræa cristata*.

OPHIOGLO'SSUM VULGA'TUM.

THAT this is a Fern very distinct from all others is demonstrated by the fact that it has never received from botanists any other generic name than *Ophioglossum*, and with but a solitary exception no other specific name than that under which we notice it. The exception is *O. ovatum*, the name under which it is described by Mr. Salisbury. Its English name is equally unique, being known by no other than Adder's Tongue. The botanical name is merely a translation of this, derived from the Greek words *ophis*, a serpent, and *glossa*, a tongue.

Root small, carrot-shaped, with numerous stout, yellow, smooth, fibrous rootlets, spreading horizontally. *Frond* from three to nine, and even more inches high; its stem pale green, round, hollow, and tapering downwards; the barren lobe of the frond, usually called the leaf, stalkless, solitary, egg-shaped, lurid green, nearly upright, sheathing the stem; the fertile lobe, which gives the plant its name, from its somewhat tongue-like shape, is really a spike of fructification, as in the *Botrychium* and *Osmunda;* it rises from withinside the base of the barren lobe, stalked, narrow, slightly tapering upwards, pointed, bearing the *fructification* in a line along each of its two edges; the fructification is embedded in roundish, yellow masses, which, gaping when the spores have escaped, present a series of clefts



OPHIOGLO'SSUM VULGA'TUM.

along each edge. This tongue-shaped lobe is usually entire, but sometimes is divided into two; the leaf-like lobe, also, though in general whole, is occasionally deeply cleft at the top.

It is usually found in meadows and moist pastures; but we have also found it in Hampshire, in an open copse, in an old chalk-pit at Abbot's Barton, near Winchester.

In *England* it has been found, also, at Middleton-one-row, Durham; Round House, near Richmond, Yorkshire; West Felton, Shropshire; behind Heawood Hall, near Alderley, Cheshire; near Warrington, Lancashire; near Braimston, Leicestershire; Heanor and Love Lane, near Derby, Derbyshire; Colwick, Nottinghamshire; Broadmoor, near Birmingham; Pottery Car; near Blymhill, Staffordshire; near Bristol; at the side of a pond on Wike Farm, Sion Lane, Isleworth; near the ladder-stile, Osterley Park, near Brentford, Middlesex; at Beddington, near Bungay, and Meltingham Castle, Suffolk; four miles south of Dorking, Surrey; meadows of Longleat, Wilts; about Slateford, near Barnstaple, Devon; and in various parts of Norfolk, Herts, Kent, and Hants.

In *Scotland*, in Dalmeney Woods, near Edinburgh; in Orkney; at Balmuto; and at Carlowrie.

In *Wales*, near Wrexham; and on the lawn of the Observatory, Dunsink, and many other parts of *Ireland*.

The first writer mentioning it as an English plant is Dr. William Turner, who, in the third part of his

Herball, published in 1568, says, "The Adder's Tongue, or Ophyoglosson, groweth in moyst and medowes in the end of April;" adding, after giving a very characteristic woodcut, "This is a wounde herbe, and healeth woundes which are almost uncurable, or at the least wonderfully hard to be healed. The nature of it is also to dryve away great swellinges, and to prevent extreme inflammations. Some use to bruise it with Swyne's grese, and to kepe it and laye it upon swellinges; but I councell rather to seth it when it is grene with sallet oyle, and to kepe it, and then will it be good both for swellings and woundes also." This is still used as an application to fresh wounds, and country-people know it as "Adder's-spear ointment."

There is a very permanent variety of this Fern, which by some botanists has been raised to the dignity of a species, under the name of *Ophioglossum Lusitanicum*, the Spanish or Lesser Adder's Tongue. Its only remarkable differences from *O. vulgatum* are its shorter growth, its producing more than one leaf, and the leaves being stalked and spear-head-shaped.

The drawing on the opposite page will best make its differences understood.

"For its discovery in the Channel Islands we are indebted to Mr. George Wolsey, who found it among short herbage on the summit of rocks not far from Petit Bot Bay, on the south coast of the Island of Guernsey, growing with *Trichonema Columnæ* and *Scilla autumnalis*." (Sowerby's Ferns, edited by Charles Johnson.)

Mr. W. Reeve, writing to us relative to the culture of these Ferns, says :—

"The *Ophioglossum vulgatum* is scarcely worth cultivating unless for curiosity, or for completing a collection, in which case it should not be absent. Although



of simple appearance, yet, when cultivated with other species of Ferns, it will not fail to give satisfaction, and, like the *Ophioglossum Lusitanicum*, may be very easily grown, and will soon spread and form a mass, under favourable circumstances, at the base of the Fernery or

rockery. Let it have a compost of equal parts loam, leaf-mould, and peat, with an admixture of sand. There is not enough interest in the plant itself to be grown away from other Ferns.

"It may be also grown in pots, or wide, shallow pans, in the same compost. It must be potted firmly, with a good drainage, and requires a good supply of water. It may be propagated by division, or by the fructification, to be treated in the same way as directed for former genera. It will be as well to give both these Ferns a slight protection in winter when cultivated in pots. Each will thrive well in the greenhouse."



OSMU'NDA REGA'LIS.

OSMU'NDA REGA'LIS.

THIS very stately Fern has never been called by modern botanists otherwise than by the above names; and its usual English names bear the same import, for it has been called *The Royal Fern*, *Osmund Royal*, *Royal Moonwort*, and *Royal Brachens*. Early writers, however, have called it by names less dignified, for we find it mentioned as *Flowering Fern*, *Osmund the Waterman*, *Water Fern*, and *Saint Christopher's Herb*.

Its *root* is tuberous, woody, scaly, sometimes extending horizontally, but at others rising erect as much even as two feet out of the ground, and at all times furnished with numerous, strong, fibrous rootlets. The *fronds* rise from the crown of the root. The fertile fronds are usually two or three feet high, and few in number; but the barren fronds are more numerous, and often attain to more than six feet; and Mr. S. Murray, on the banks of the Clyde, measured one tuft that was eleven feet and a half in height. Their *stem* is smooth, and reddish when young; they are doubly leafleted, the primary divisions being opposite, and the secondary divisions mostly alternate. *Leafits* smooth, bright green, nearly stalkless, somewhat heart-shaped, or slightly lobed at the base oblong, bluntish, entirely or only slightly scolloped, but we have seen them slightly toothed; they have one mid-vein, and numerous lateral veins. In the fertile fronds the upper leafits are divided and changed, as it were, into dense clusters or spikes of

capsules. The terminal divisions of the frond are composed entirely of such capsules, forming a compound, loose cluster or panicle. Each *capsule* is at first green, but becomes pale reddish-brown, veined, two-valved, and on a short stalk; the seeds (*spores*) are numerous, and nearly globular.

It is not very common, and is found in wet bogs, woods, and hedges.

In *England* it has been found at Low-gelt Bridge, Allowby, and Keswick, in Cumberland; between Stonebridge and Bradnock's Marsh, near Parker's Mill, in Warwickshire; at Ellesmere Lakes, Moreton Moors, and West Felton, in Shropshire; at Speke, between Crosby and Formby, and on Chat Moss, near Liverpool; Walston Moss, near Warrington, in Lancashire; in the Isle of Man; Chartley Moss, in Staffordshire; at Pottery Car, near Doncaster; near Leeds; near the upper mill at Bulwell, in Nottinghamshire; on bogs near Yarmouth, and St. Faith's, Newton Bogs, Norwich; in Kavanagh's Wood, Great Warley, near the Barracks at Little Warley, and at Danbury, in Essex; near Leith Hill, and near Dorking, in Surrey; on Bagshot Heath; between Frimley village and Frimley Green, and on Esher Common, in Surrey; at Tunbridge, in Kent; at the corner of the Lake, Uckfield, in Sussex; on the cliffs near Dawlish, near Chudleigh, on the banks of the Teign, and at Ivy Bridge, on the Erme, in Devon; on the Goodhilly Downs, near St. Ives, and in the mouths of old mines near Marazion and Cosgarne, Cornwall; in the Isle

of Wight; at Sandford Bridge, near Wareham, and at New Bridge, near Wimborne, in Dorset; in the New Forest, and at Freemantle, near Southampton.

In *Scotland*, at the head of Loch Fine, to the north-east of Inverary, Argyleshire, and on the Dumbarton side, near Loch Lomond; at the side of the Loch at Inclinedamff, Sutherlandshire; in Aberdeenshire, and on the coast of Kincardineshire.

In *Ireland*, at Mucruss Abbey; at Castlebar, in Mayo, and in Kelly's Glen, county of Dublin.

In *Wales*, near Llyn Traffwll, in the turbary at Trewilmot, near Holyhead.

The first notice of this "flower-crowned Prince of British Ferns" is in the edition of *Gerarde's Herbal* of 1597. He says, "It groweth in the midst of a bog, at the further end of Hampstead Heath, from London, at the bottome of a hill adjoyning to a small cottage, and in divers other places; as also upon divers bogges on a heath or common neere unto Bruntwood, in Essex, especially neere unto a place there that some have digged, to the end to find a nest or mine of gold; but the birds were over fledge, and flowne away, before their wings could be clipped."

The root of this Fern was considered by ancient physicians, "especially the heart, or middle part thereof," as a powerful remedy if applied to wounds. That "middle part," says Gerarde, "hathe beene called the heart of Osmund the Waterman."

Dodoens, in 1583, was the first to call this Fern by the name of Osmund; and, as Dodoens was a Fleming,

we might expect from Flanders to ascertain the origin of this name; but it remains unexplained. Parkinson says it was called "*Osmunda regalis*, of the singular properties therein;" but whether he refers to the first or second word of the name is not specified. *Osmund*, in Anglo-Saxon, is "House-peace;" at least, so says Camden; and "House-peace royal" may have reference to its then credited powers as a vulnary.

Wordsworth, with a poet's license, but no authority, thus speaks of this Fern:—

> "Fair Ferns and flowers, and chiefly that tall Fern,
> So stately, of the *Queen Osmunda* named;
> Plant lovelier, in its own retired abode,
> On Grasmere's beach, than Naiad by the side
> Of Grecian brook, or Lady of the Mere,
> Sole-sitting by the shores of old romance."

Another poet anonymously refers to the same plant as follows:—

> "Auld Botany Ben was wont to jog
> Thro' rotten slough and quagmire bog,
> Or brimfull dykes and marshes dank
> Where Jack-a-Lanterns play and prank,
> To seek a cryptogameous store
> Of Moss, of Carex, and Fungus hoare,
> Of Ferns and Brakes, and such-like sights,
> As tempt out scientific wights
> On winter's day; but most his joy
> Was finding what's called *Osman Roy*."

This most noble of all the British Ferns, being so distinct from all others, and being so easily cultivated, should not be absent from any collection. Mr. W. Reeve says that it will be found to delight in a compost of three-parts fibry peat and one of vegetable mould,

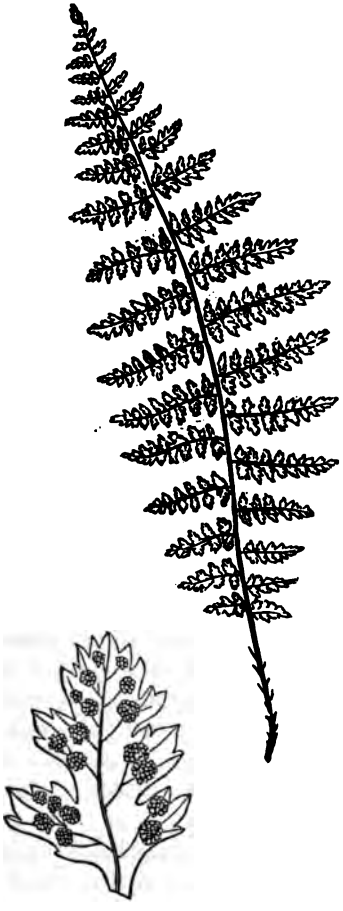
with a free admixture of silver sand. If grown in a pot, which must be large, or other confined space, it must have good drainage, and an abundant and continuous supply of water. With a moderate space for its roots it makes a noble-looking plant. For open-air culture it prefers a damp, shady situation, and in the compost as for pot-culture it will thrive and do well. It may be also grown in exposed situations with an abundant supply of water through the summer months. In such an exposure it will not produce nearly such fine fronds as in one more shaded; yet, if a constant supply of water and good drainage can be secured, it will do remarkably well. We have also grown this *Osmunda* very successfully in a stove temperature, where it will, with plenty of light, form also a pleasing object. It is too large for a Wardian case. It may be increased by sowing its seeds, and also by division; but by its seeds is the best mode.

POLYPO'DIUM ALPE'STRE.

THIS, until a few years since, was unnoticed as a British Fern, apparently because it has the aspect, unless closely inspected, of *Athyrium filix-fœmina*. It has been called *Polypodium rhæticum* and *Pseudathyrium alpestre;* but we know of no other English name than *Alpine Polypody*, a name very appropriate, because it is found only in mountain glens at high elevations.

Root, in its wild state, lying down, much branched, with a tuft of fronds at the end of each branch. *Fronds*, from one to three feet high, in circular tufts; their stem rather swollen at the base, and only about one-fifth of its length bare of leaflets, this bare part having a few brown, broad, pointed scales. The general outline of the frond is narrow spear-head-shaped; *leaflets* alternate, and their *leafits*, like the frond, narrow spear-head-shaped, on short stalks, at right angles with the stalk of the leaflet, deeply cut at their edges, and each section sharply toothed; their mid-vein zigzag, and with lateral veins branching into each section, bearing a mass of *fructification* at the end of one of their branches midway between the mid-vein and edge of the leafit. Each mass is circular, generally distinct, but sometimes running together.

This Fern was first discovered in the British Isles by Mr. H. C. Watson, who, in 1841, found it on Ben Aulder, in Inverness-shire, and in Caulocken Glen, Forfarshire. It has since been found on the Clova Moun-



POLYPO'DIUM ALPE'STRE.



tains by Mr. Backhouse, who observes that *Athyrium filix-fœmina* accompanies it up as high as from 2,000 to 3,000 feet; but from the latter height, up to 4,000 feet, *Polypodium alpestre* is alone.

Mr. W. Reeve informs us that *Polypodium alpestre* is well worthy of cultivation, for, when successfully grown, it is erect, yet elegant. It requires a well-drained compost, composed of fibry peat two parts, and fine loam and leaf-mould equalised to form the other two parts, with an admixture of silver sand and freestone crocks, or some such porous substance, broken very small. The plants in pots must have a good drainage, and be kept moist during the growing season, and gradually dried off and ripened as winter approaches, when they will require a slight protection; to be either shifted into larger pots or deep pans in the spring, or to be parted and placed in smaller pots. If cultivated on rockwork, or in any fixed situation, care must be taken to procure a thorough drainage. In any case, if the drainage is bad, the plant will not thrive. It must be planted firmly upon a shallow supply of the above-named compost. This, with a few pieces of porous stone or old mortar laid about the surface, will be beneficial. It prefers an open situation, but does not like the rays of the sun much. If these directions are followed, and a moderate supply of water given overhead during the growing season, success may be expected. It may be grown well in a greenhouse where it can have plenty of light, and it can be propagated by division.

POLYPO'DIUM CALCA'REUM.

This, by modern botanists, was confounded with *P. dryopteris*; but, though much resembling, there is no reasonable doubt of their being two distinct species.

Root dark brown, but stouter and less widely creeping than that of *P. dryopteris*. Its rootlets are almost black, scattered, and wiry. The *stem* of each frond is firm and stiff, varying in height from six to eighteen inches, and nearly two-thirds of its length being without leaflets. The stalks of the two lower leaflets are so much more stout than the stalks of those above them, that some botanists consider them as two branches, and call it a three-branched Fern. The unleafleted portion of the stem is stout, pale, very scaly, and bearing numerous small, stalked *glands*. These glands are found also on the leaflets, and give the whole plant a mealy aspect. The general outline of the *frond* is nearly equilateral triangular. *Leaflets* opposite; the lower ones, in very luxuriant specimens, have *leafits* alternate and deeply cut (pinnatifid). The upper leaflets are only deeply cut, or lobed; but the edges of both leafits and lobes are scolloped and fringed with very small, stalked glands. Each leafit and lobe has a wavy mid-vein, from which proceed very regularly, in pairs, lateral or side-veins; these side-veins are also very regularly forked, and on the upper branch of each fork, about midway between the edge of the leafit or lobe and its mid-vein, is a circular mass of *fructification*. The masses become



POLYPO'DIUM CALCA'REUM.

brown and crowded as they ripen. The colour of the entire frond is a very distinguishing mealy, dark green.

It is found only on a limestone soil (whence its specific name, *calcareum*), on mountainous heaths, and in wooded places. We are not aware of its being found native in either Ireland or Scotland; but in *England* it grows about Matlock Bath, and on the road-side under the Lover's Leap at Buxton, in Derbyshire; at Sheddin Clough, near Burnley, and near Lancaster; at Arncliff, Gordale, White Scars, near Ingleton, and near Settle, in Yorkshire; on Cheddar Cliffs and Box Quarries, near Bath, in Somersetshire; and in Leigh Woods, near Bristol.

This is not a newly-discovered Fern, for it was known to Clusius, Tabernæmontanus, and Gerarde; but it was first recognised as a native of England by the late President of the Linnæan Society, Sir J. E. Smith. It has been described by botanists under the following names:—*Gymnocarpium Robertianum*, *Lastræa calcarea*, and *L. Robertiana*, *Phegopteris calcarea*, and *Polypodium Robertianum*. In Johnson's edition of *Gerarde's Herbal* it is figured and described as *Dryopteris Tragi*. In English it is known as the *Limestone Polypody*, *Rigid three-branched Polypody*, and *Smith's Fern*.

Mr. W. Reeve says that this Fern, like the *P. alpestre*, is a desirable species for cultivation, and is very scarce. It is pretty, and may be very successfully treated. It will be found to prefer, and, in fact, will not do in any other than, a free, open compost, composed of fibry peat, loam, and vegetable mould, equalised to form

two parts, and very old mortar and lime or sandstone for the other two parts, with a free addition of silver sand. A good drainage must also be secured, and the plant fixed firmly in the situation it is to remain in. It likes a free supply of water overhead through the summer months, but to be withheld as winter approaches; and it must be ripened off to stand through that season. The above-particularised compost and directions will be suitable either for pot-culture or for cultivation on rockwork, where it will bear moderate exposure to the sun; but, as with the *P. alpestre*, a thoroughly good drainage and a free supply of water will be necessary; the water, of course, not to be used while the sun is shining upon it. It thrives remarkably well in a greenhouse, and may be easily propagated by division.



POLYPO'DIUM DRYO'PTERIS.

POLYPO'DIUM DRYO'PTERIS.

THIS Fern has uniformly borne the specific name of *dryopteris*, from being sometimes found among the moss about the root of Oak-trees, *drys* being the Greek for an Oak, and *pteris* for a Fern. It has been included, however, in various genera by different botanists, being described by them as a *Gymnocarpium*, *Lastræa*, *Phegopteris*, and *Polystichum*. In English it is known as the *Three-branched Polypody*.

Its *root* is black, widely creeping, thread-like, wavy, and slightly hairy, with numerous tufts of rootlets. *Fronds* from five to twelve inches high, with nearly a five-sided outline when laid flat; but this form is not apparent in their growing posture, owing to their very flaccid growth. *Stem* slender, brittle, pale green, very smooth, with the exception of a few scales at the bottom; dividing into three branches at the top, each *branch* about one-third the length of the stem, but the middle branch is rather the longest. The branches spread loosely and drooping, so as to be arched above. The branches really are large, pale, bright green leaflets, smooth, fine-textured, and cut into deep, oblong, blunt segments, wavy or toothed at their edge, and rather rolled back, and smooth, except having a slight downiness on the mid-vein. Instead of segments there are a few stalkless leaflets near the base of each branch. Each branch is triangular in its general outline. Mid-vein wavy, with alternate side-veins, which fork, and

bear a mass of *fructification* on the inner branch of each fork midway between the edge and the mid-vein of the segment of the leaflet. The masses are pale, convex, and permanently distinct, turning brown when ripe, and are without hairs, scales, or other covering.

It is found on shaded mountain-sides. In *England*, above Langley Ford, near the Cheviot Mountains; among rocks at the fall of Lodore, Derwent Water, in Cumberland; in Barrowfield-wood, near Kendal; near Durham; in Wedwood Forest, near Yoxhall Lodge, Staffordshire; near the upper part of the Tees; at Hill Cliff, Cheshire; Egerton Moor, and Dean Church Clough, near Bolton; and Boghart Hole Clough and Prestwich Clough, Lancashire; rocks at Belle Hag, Sheffield; Richmond, and about North Bierley, in Yorkshire; Cornbury Quarry, in Oxfordshire; at Froddesley Hill, and north side of Titterstone Clee Hill, in Shropshire; in woods north-east of the road up Frocester Hill, in Gloucestershire; and Leigh Woods, near Bristol.

In *Wales*, near Tintern Abbey; at Craig Breidden, Montgomeryshire; Rhaiadr-y-Wenol-Twll-Du, Caernarvonshire; near Llangollen on a slate rock; frequent in North Wales.

In *Scotland*, on the banks of the White Adder, between the Retreat and Elm Cottage, Berwickshire; at Langholm and Broomholm, in Eskdale; at Moray, in Ross-shire; Hawthorn Dean, near Edinburgh; about Dunkeld, in Stormont; common in Aberdeenshire, Forfarshire, and Perthshire.

In *Ireland*, at Connamara, Killarney, Mourne Mountains, Mam Turk, Tullamore Park, Turk Mountain, and other mountain districts.

This is the *Filix ramosa minor*, or Smaller-branched Fern, of Bauhin's *Historia Plantarum*, where it is well represented by the woodcut. It is certainly not the *Dryopteris Tragi* of Clusius, Gerarde, and Parkinson.

It was not known to Ray as a British plant when he published, in 1670, his *Catalogus Plantarum Angliæ;* but he had discovered it near Tintern Abbey before he published the first volume of his *Historia Plantarum*, in 1685, and this is the first certain notice of its being a member of the British Flora.

The *Polypodium dryopteris* is well worthy of cultivation, and, from its distinctness and comparatively compact habit, will be found to be very useful for rock-work, or any retired spot where moisture and shade can be commanded. It has, like the last-named species, a creeping main root, and will, like it, also require a shallow compost, composed of two-thirds fibry peat, with one-third leaf-mould, and a free admixture of sand and a little finely-broken sandstone. This compost will grow it either in the rockery or in a pot. In either case a good drainage must be secured; for, although the growing plant delights in an abundant supply of water, yet it is most averse to water remaining about its roots.* Therefore this must be attended to, and, after the usual articles are placed (such as crocks, broken bricks, or porous stones) for the drainage, a layer of moss, or the roughest parts of the peat, should be placed over the

crocks or stone. This will prevent the fine compost from filling the vacancies among the drainage upon the moss or rough peat. A depth of about three inches of the prepared compost will be quite sufficient. Upon this the plants are to be placed rather firmly, the main root of the plants to be just, and only just, below the surface. After this is done, providing the weather is anything but wet, a moderate watering should follow to settle the whole, after which the plants will require to be kept moist until the new fronds begin to unfold, when, as they increase in size, a free supply of water will be necessary over the whole plant, so that a shady, moist atmosphere may be kept about it as steadily as possible.

The same directions as regards drainage and planting must be observed for pot culture, giving a continual supply of water during the growing season, and keeping the pots in the shade.

This *Polypodium* may be readily increased by division. As winter approaches the water should be gradually withheld, and the plants allowed to have a drier soil to stand in through that season. The plants in pots should have a slight protection during the winter. They thrive remarkably well in a greenhouse, and would do well for a case of hardy Ferns.



POLYPO'DIUM PHEGO'PTERIS.

POLYPO'DIUM PHEGO'PTERIS.

This species, by some botanists, has been included in the following genera—*Gymnocarpium*, *Lastræa*, and *Polystichum*. In every instance, however, they retained the specific name, *phegopteris*, singularly inapplicable as it is; for *phegos*, a Birch-tree, and *pteris*, a Fern, literally the Beech Fern, has no reference either to its shape or to its haunts, for it is more rarely found in woods than on mountains. In English it is known as the *Pale Mountain Polypody*, *Mountain Polypody*, and *Sun Fern*, names referring to the high and fully-exposed-to-the-light situations in which it delights.

Its *root* is dark-coloured, thread-shaped, wavy, widely-creeping, scaly, and slightly hairy, emitting fibrous rootlets in tufts wherever fronds are produced from it. *Fronds* scattered, erect, five to eighteen inches high, sharp-pointed, spear-head shaped, delicate-textured, covered with small hairs. *Stem* brittle, pale, slender, sometimes rather scaly, more than half its length unleafleted. *Leaflets* sharp-pointed, opposite, the two lowest separated widely from those above them, bent forward, and rather hanging down. Most of the leaflets are deeply cut into numerous broad segments. Each segment is blunt, wavy, somewhat scolloped; sometimes, however, entire, covered with fine hairs, and often fringed. The uppermost leaflets composing the sharp point of the frond are entire, and without segments. The mid-vein of each segment is wavy, and more hairy

than the other parts of the leaflet. The hairs in various parts are often in tufts, or starry. The side-veins are alternate, usually unbranched, and bearing at their upper end, near the margin of the segment, a mass of *fructification*. Each vein does not bear a mass, therefore the row is broken. Each mass is naked, circular, very small, and pale yellowish-brown.

It is chiefly found in the clefts of rocks in moist, mountainous situations, sometimes on open, stony moors, and still more rarely in woods, but, wherever found, the soil abounds with moisture.

In *England* it has been found on rocks above Langley Ford, at the foot of the Cheviot Hills; at Cawsey Dean, Durham; about Keswick, Cumberland; at Egerton Moss, near Bolton, Belle Hag, near Sheffield, at Settle and Wensley Dale, Yorkshire; at Prestwich Clough and Boghart Clough, Lancashire; at Norwood, Surrey; near Brentford, Middlesex; at Lidford Fall and Beckey Fall, Dartmoor, Devonshire; and in the Isle of Man.

In *Wales*, near Llanberris, in the first and second fields towards Snowdon; Capel Curig, North Wales; and in Caernarvonshire.

In *Scotland*, on the Grampians, in Aberdeenshire; on Red Caird Hill, west of Inverness-shire; in Forfarshire, Sutherland, Dumbarton, and other parts of the Highlands; in Moray and Ross-shire; on Ben Lomond; at Ruberslaw and Jedburgh; and at Campsie, near Glasgow.

In *Ireland*, on the right hand of Powerscourt Water-

fall; at Waterfall above Lough Eske, in Donegal; and in other parts of northern counties.—(*Francis' Analysis of British Ferns.*)

This Fern was not known as a British plant when Ray published, in 1670, his *Catalogus Plantarum Angliæ;* but it is included by Morrison and Bobart in their *Historia Plantarum Oxoniensis*, published in 1680, and Bobart states that it had been found in the northern parts of England by Mr. T. Lawson and Mr. D. Lhwyd (Lloyd). In those parts it had also been observed by Dr. James Sherard. Dillenius mentions it, in 1724, in the third edition of Ray's *Synopsis Methodica Stirpium Britannicarum*, as "Filix minor Britannica pediculo pallidiore, alis inferioribus deorsum spectantibus." (The smaller British Fern, with paler stem, and lower wings looking downwards.)

The *Polypodium phegopteris* is a free-growing and very pretty species. Under favourable circumstances it will not fail to repay the cultivator. It is remarkably well adapted for cultivating upon the shaded and most moist parts of a Fernery or rockery. Such a situation must be secured for it, it being particularly partial to an abundant and constant supply of water about its roots, and also as often as possible overhead, during the growing season. A situation on the Fernery, where it might be partially overshadowed by some projecting portion of the rockwork, would be suitable; but, although it delights in a situation like this, yet it must be well drained, so that the mould about its roots does not become soddened and water-logged, for stagnant water

throws the plant into a sickly state, and finally deprives it of life.

Having chosen or constructed a suitable place for it, proceed to drain as directed for the last species, using a moderately thick layer of sphagnum moss, or the roughest parts of the peat, to be pressed firmly together; upon that may be placed a few lumps of sandstone, if at hand, or porous stone of any kind. Room to be allowed for five or six inches of the following compost:—Fibry peat three parts, loam one part, and leaf-mould one part, with a free admixture of silver sand. The Fern to be planted firmly in it, so that the main root is barely below the surface, when a few pieces of finely-broken stone strewed about the surface will help to keep the soil open. This operation is best done early in the spring. When all is finished, a liberal watering may be given, and the whole left a few days to settle. Just enough water to keep the soil moist will be sufficient until the young fronds begin to unfold, when a more liberal supply must be given, and continued until the winter is approaching, when water must be withheld, and the soil only kept slightly moist through that season.

For pot culture the same compost may be used, well draining the pots, or deep pans, which are, perhaps, better, and placing the plants in the same manner as on the rockwork. These must be kept in a close, shady place, and be freely supplied with water, or failure will most surely be the result. This Fern may be very successfully grown in a greenhouse or cool stove,

where it may be kept green through the winter, but the pots should have a slight protection. It is very readily increased by division, which should be done in spring.

POLYPO'DIUM VULGA'RE.

With but one exception botanists have never called this Fern by any other name than *Polypodium*, a name derived from two Greek words, *polys*, many, and *pous*, *podos*, a foot, and having reference, according to Theophrastus, to the resemblance borne by its numerous rootlets to the feelers of the polypus. Mr. Newman alone has described it under the name of *Ctenopteris vulgaris*. It is usually called the *Common Polypody*, *Polypody of the Oak*, and *Wall Fern*.

Root creeping horizontally, having very many stout, branched, somewhat woody, hairy rootlets; if left undisturbed becoming very much twisted and matted; densely clothed with membranous, brown, narrow-toothed, pointed, shining scales. *Fronds* from six to eighteen inches high; lowest third of their stalk naked, grooved in front, and smooth; narrow spear-head-shaped, deeply cut into many segments, often nearly to the stalk; the segments parallel, slightly distant, narrow oblong, blunt, and flat; seldom quite entire, but often wavy and even toothed, especially at the end. Each segment has a zigzag, prominent mid-vein, from which lateral veins issue alternately. The lowest side-vein, and next to the mid-vein, exclusively bears at its end, if fertile, a mass of fructification. These masses of *fructification* are thus in a row, and mid-way between the mid-vein and margin of the segment; each of the other side-veins terminates in a little knob, which



POLYPO'DIUM VULGA'RE.



looks like an abortive mass of fructification. Each mass is circular; depressed at first, but becoming prominent; without any cover (*indusium*), and often running together when ripe. They are then shining, orange-tawny coloured. The spores burst open when moistened. The upper part of each frond is usually fertile.

There are three varieties of this Fern found in the British Islands.

1. *Polypodium vulgare Cambricum*, or Common Welsh Polypody. It has a broad, somewhat egg-shaped frond, with the segments irregularly toothed, and always barren. Linnæus considered it a distinct species. This was first known as a British variety in 1686, being then mentioned by Ray in his *Historia Plantarum*. He says that he received it from Sir Hans Sloane, and that it was first discovered near Dennis Powis Castle, three miles from Cardiff, in Glamorganshire. It has since been found at Chepstow, in Monmouthshire, near Dundry Church, in the vicinity of Bristol, and at Braid Hall, near Edinburgh. *P. vulgare sinuatum* is a very slight variation of this.

2. *Polypodium vulgare serratum*, or Common toothed Polypody. The segments of this are very regularly, and often doubly toothed. It is first mentioned as a British variety in 1724 by Dillenius, in his edition of Ray's "Synopsis of British Plants." He says it was found on the walls of Windsor Castle by the Rev. Mr. Manningham. It has been found, also, near Bristol, in the Ashton Manor and Leigh Woods. *P. vulgare acutum* is a very slight

variation of this, the segments being more pointed, and has been found on rocks in North Wales; in Cobham Park, Kent; and in meadows near Malden and Ewell, in Surrey. *P. vulgare Hibernicum* is another sub-variety, the segments being more deeply cut and partly scolloped, found in the Dargle, in the county of Wicklow.

3. *Polypodium vulgare bifidum*, or Common forked Polypody. In this variety the end of each segment is forked or divided into two segments, spread away from each other. Sometimes the segments are divided into three lobes at the end, and it is then called *P. vulgare proliferum*. This variety has been found in a wood near Bingley, in Yorkshire, and at Chepstow, in Monmouthshire.

Many other sub-varieties might be mentioned, but they all pass by various gradations into one another, and we do not believe that any one of the varieties is permanent. Cultivation, we think, would reduce them all to the form of the original species. This species is common throughout the British Islands on old walls, old roofs of cottages, shady banks, and trunks of old trees.

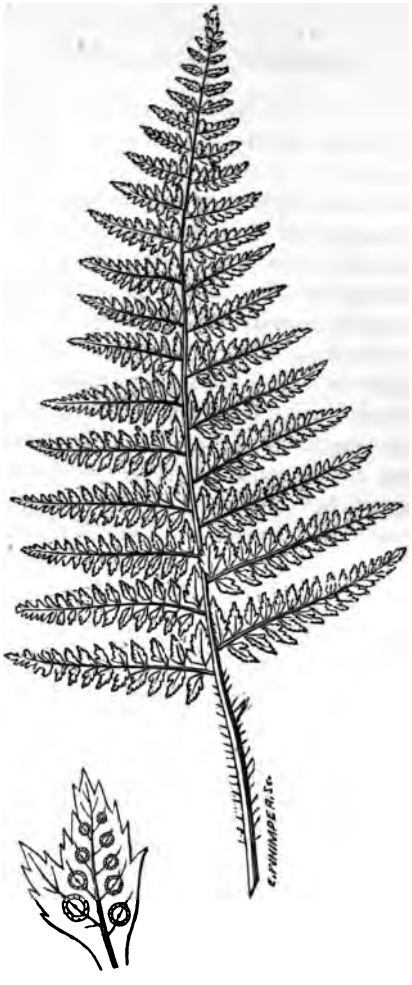
The first botanical writer who mentions this as an English Fern is Dr. William Turner. In the second part of his "Herbal," published in 1562, he gives a very fair woodcut of this plant, and speaks of it as the "Englishe Polypody," "Wall Ferne," and "Oke Ferne." Lyte and Gerarde copied Turner's woodcut. They all dwell upon *the* medical qualities of this Fern; but, although

Dioscorides did so before them, it is only thereby demonstrated to be an error so much the older. They recommended it as a cathartic; but Dr. Woodville correctly observes, "Another character in which it has been recommended, and for which, from its sensible qualities, it seems to promise more advantage, is that of a demulcent or pectoral; thus conjoined with liquorice its good effects have been experienced in coughs and asthmatic affections. However, it is now rarely used in this country, nor have the French authors, Poissoner and Malouin, who have cited instances of its success in mania, been able to restore to it its ancient reputation in this calamitous disorder."

The root, which is the part medically made use of, has a peculiar bitterish-sweet taste when fresh. It has been analysed by M. Desfosses, who found in it a sweet substance resembling sarcocollin, mannite, incrystallisable sugar, starch, albumen, malic acid, lime, magnesia, and oxide of lime. M. Planche also found in it viscin, which is more popularly known as bird-lime.

Mr. W. Reeve is a great admirer of this species. He says, "The most distinct, the most generally known, and, perhaps, the most ornamental of all the *Polypodiums* is *vulgare*. It is a very handsome and useful Fern, and well adapted for cultivating upon the Fernery or rockery, or for adorning any out-of-the-way place. It is so well known, and so easily managed, that little need be said of its culture. The more elevated parts of the rockwork will be most suitable for it, and the shady parts in preference to the more exposed parts, although it will bear

a moderate degree of exposure to light when once established. It particularly delights in the decaying trunks of old trees, so that these should be introduced in forming the rockery, and the plants fixed upon them by filling the crevices with fine leaf-mould, peat, and sand, and fixing the main root of the Fern upon this compost early in the spring; or it may be planted in other parts of the rockery in the above-mentioned compost, with a free admixture of sand. It requires only a moderate supply of water, and must be well drained. It is as hardy as any of the species, but will, if protected a little, remain green all the winter. If exposed to severe frost the fronds become brown and die off. It will grow very well in pots or pans with a good drainage, and in the above-named compost. It will grow, also, in the greenhouse, where it forms a very pretty object, and becomes evergreen. It may be easily propagated by division, which must be done in the spring."



POLY'STICHUM ACULEA'TUM.

POLY'STICHUM ACULEA'TUM.

THIS has been included by various botanists in the genera *Aspidium* and *Polypodium*, but all have retained the specific name *aculeatum*, prickly, on account of the sharp-pointed character of the teeth on the edge of the leafits. Some botanists consider it and *P. angulare* only different forms of the same species. In English it is known as the *Common Prickly Shield Fern.*

Root large, woody, enlarging very slowly, tufted, producing many coarse, wiry side rootlets. *Fronds* numerous, spreading in a circle; their upper side shining, dark bluish green, but paler underneath; in general outline spear-head shaped, sometimes broad, at others narrow, but always tapering to a point, and rather stiff when mature, though very limp when young; in height from two to three feet. *Stem* leafleted to within three or four inches of its base, and covered throughout with reddish-brown scales. *Leaflets* alternate, close together, narrow spear-head shaped, tapering to a point. *Leafits* all rather convex, alternate, the upper one next the stem always larger than the others, and parallel with it, giving the stem somewhat the appearance of being bordered with alternate leafits. They are distinctly, though rather shortly stalked, irregular arrow-head shaped. Towards the upper end of the leaflet they are joined together at their base (decurrent); the upper side of each is largest, sharply saw-toothed, the teeth being unequal, and the points so sharp as to be really prickles;

the end tooth inclines to one side; the lowermost tooth on the upper edge forms somewhat of a lobe. The mid-vein of each leafit has alternate side-veins, and these side-veins are again branched; of the upper side-veins that next the mid-vein bears a mass of *fructification*. The fructification is produced almost exclusively on the leafits at the top of the frond, and the masses form a parallel line of circles, gradually diminishing in size from the base of the leafit to its point on each side of the mid-vein. They often press against each other, but rarely run together. Each mass has a flat, circular cover, unnotched, and with an elevation in the centre when young.

There are two varieties, which seem merely alterations of form, arising from accidental circumstances of soil and situation, and of which it is sufficient to say, that of *obtusum* the teeth are more scollop-shaped, yet prickly; and *alatum* has the leaflets connected by a wing proceeding from the sides of the stem.

It is most common in the south of England in woods and on shady banks, especially if moist and stony.

In *England* it has been found at Benroyd Clough, Norland, and Toadholes Wood, in Sowerby Dean, both near Halifax, and near Richmond, in Yorkshire; in Leigh, St. Anne's, and Stapleton Woods, near Bristol; in Burton Wood, near Warrington, in Lancashire; in Shapscombe Wood, near Painswick, Gloucestershire; at Ulverscroft Priory, in Charnwood Forest; at the Valley, near Bromsgrove, in Worcestershire; in the Isle of Man; at Elmdon House, Warwickshire; on Little Warley Common, Essex; about Tunbridge Wells,

Kent; near Bramshot, Hants; at Osterley Park, Lampton Lane, and Sion Lane, near Brentford, in Middlesex; near Hastings and other places in Sussex; at Kingsteignton, in Devon; and near Gurnet Bay, in the Isle of Wight.

In *Wales*, near Wrexham, in Denbighshire; at Cickle, near Beaumaris, and at Lleiniog Castle, Anglesey; and near Bangor and Caernarvon.

In *Scotland*, about Drumlanrig, in Nithsdale; at Peasebridge; and on Cartland Rocks, near Lanark.

In *Ireland*, at Colin Glen, Belfast; Hedge Banks, near Carrickfergus; and near Clonmel.

Johnson, in his edition of "Gerarde's Herbal," is the first to mention this Fern as a British plant, and we have the unusual occurrence, not only of the name of its discoverer, but of the very day of its discovery. He describes it as *Filix mas non ramosa pinnulis latis, auriculatis, spinosis* (Male Fern not branched, with broad eared and prickly leafits); adding, "This I take to be *Filix mas aculeata major Bauhini* (Bauhin's Larger prickly Male Fern); neither have I seen any figure resembling this plant. It groweth abundantly on the shadowy moist rocks by Maple-Durham, near Petersfield, in Hampshire. *John Goodyer, July* 4, 1633."

Polystichum aculeatum is a free-growing, easily-managed, and very desirable Fern for the rockery, fernery, and also for pot culture. It grows remarkably well in sandy loam and peat (fibry is the best) in equal parts, with an admixture of sand. It requires a tolerable depth of mould to grow in, and to be well

drained. During its growing season it must be supplied rather freely with water, although not to make the soil marshy. It bears exposure to light pretty well when once established, but will become much finer if in the shade. It is perfectly hardy, and will bear very severe weather unless the roots are too much exposed, for in that case it is apt to perish. If grown in pots, a slight protection of some kind is desirable, for it will bear indoor treatment much better than many others of the British Ferns. The fructification is ripe by the end of the summer, and from the fructification it may be increased in the same way as directed for other Ferns.



POLY'STICHUM ANGULA'RE.

POLY'STICHUM ANGULA'RE.

THIS is the *Aspidium aculeatum* of the botanist Kunze. Indeed, there is much disagreement among authorities as to the differences between *Polystichum aculeatum* and *P. angulare* and their varieties. As there are sufficient points of distinction we have avoided, by retaining them as separate species, any attempt to reconcile the dissentients. That now under our consideration is the *Aspidium angulare* of some botanists. In English it has been called *Angular-leaved Shield Fern*, *Soft Prickly Shield Fern*, and *Angular Prickly Shield Fern.*

Its main *root* is large, tufted, often upright and trunk-like when old. It sends forth many creeping side-shoots, which produce crowns, and the whole are furnished with many coarse, wiry rootlets. The *fronds*—spear-head shaped in general outline—vary in height from two to four, and even more, feet. They are more soft and delicate in their texture than those of *P. aculeatum*, consequently they are more flexible, drooping, and elegant in their habit of growth; they are also more shaggy. Of the *stem* about one-fourth is unleafleted, and is, as well as the stalks of the leaflets, very thickly covered with reddish-brown chaff-like scales. Towards the extreme ends of the leaflets the scales gradually are finer until they really become hairs. The *leaflets* are alternate and narrow spear-head in outline. The *leafits* are alternate, flat, stalked, and would be pointed egg-shaped if the upper side did not produce near its base an irregular-

toothed lobe; all are saw-edged. The lowest leafit on the upper edge of the leaflet's stalk, and next the stem of the frond, is larger than the other leafits, though not so markedly larger or regular in its position up the stem as in *P. aculeatum*. All the lobes and teeth end in hairs, softer and less bristle-like than in *P. aculeatum*, and on their under surface are many hair-like scales. The mid-vein of each leafit is straight, emitting side-veins in opposite pairs, and the side-veins are branched. On the lowest of the upper branches of these side-veins is the *fructification*. It is in circular masses, each having a cover (*indusium*), slightly depressed in the centre, and usually entire.

There are two varieties. *Subtripinnatum* (almost-doubly-leafited), with the lower leafits very deeply cut, and the sections or lobes sometimes distinct. *Angustatum* (narrow-leafited), all the leafits being very narrow, and much more pointed than are those of the species.

It is found in similar situations as *P. aculeatum*, and is plentiful in England, Wales, and Ireland, but less abundant in Scotland. Wherever *aculeatum* occurs this species is likely to be found.

There is little doubt that this species was known to Ray in 1696, when he published the second edition of his *Synopsis Stirpium Britannicarum*. After particularising the Fern we have previously described as *Polystichum aculeatum*, Ray next mentions *Filix Lonchitidi affinis* (Fern related to Lonchitis), adding, "Under this *title* was sent to me, by Mr. Lloyd, a plant like to the

preceding, but with rounder leafits, and covered all over with longer scales. He collected it in the mountain parts of Wales."

Mr. W. Reeve very correctly observes that *Polystichum angulare* will thrive remarkably well under the same course of treatment as was given for *P. aculeatum*; for like that it delights in a well-drained, shady situation, and in the same compost. It is a very desirable and a very hardy plant; yet, when cultivated in pots or situations where the roots are much exposed, a slight protection will be necessary during severe weather. It may be increased in the same manner as *aculeatum*.

POLY'STICHUM LOBA'TUM.

THIS is considered by some botanists merely as a variety of *Polystichum aculeatum*, but from Ray downwards it has been admitted as a distinct species by many authorities. Ray in his *Synopsis Stirpium Britannicarum* describes it as *Filix aculeata major, pinnulis auriculatis crebioribus, foliis integris angustioribus* (larger prickly Fern, with closer and eared leafits, and with the whole fronds narrower). Sir J. E. Smith, after quoting this description, adds, "Ray has well marked the differences between *P. aculeatum* and *P. lobatum*." Mr. Francis sums up the distinctions very effectively as follows:—

"This species is distinguished from *aculeatum*, for which alone it can be taken, by the decurrent lobes; and as Sir J. E. Smith very rightly observes, 'by the much shorter, more crowded, and less scaly pinnæ (leaflets).' Added to which the pinnules (leafits) are more entire, being but slightly eared, very convex, thick, and of a glaucous colour, furnished with a less number of, and smaller, bristly serratures, sometimes wanting them entirely at the sides. The sori also are more confined to the top of the leaf, and larger than in *aculeatum*. The variety *lonchitidoides* is not very scaly, and in form and size exactly intermediate between this species and *lonchitis*."

It is the *Polypodium lobatum* of Hudson, and the *Polypodium lonchitidoides* of some other botanists. In English it was called by Ray *Prickly Male Fern with narrower leaves*, and by others *Close-leaved Prickly Shield Fern*.



POLY'STICHUM LOBA'TUM.

Main *root* large, tufted. *Fronds* evergreen, produced in a circle, from one foot to two feet high, stiff, narrow spear-head shaped in their general outline, milky green in colour, and surface very shining. *Stem* strong, very scaly, and leafleted almost to the base. *Leaflets* alternate, short, very gradually decreasing in length as they approach the top of the stem, curved upwards; so close together near the bottom of the stem as to overlap each other. *Leafits* pointed egg-shaped, at their base running much into each other; slightly saw-toothed; only the larger ones eared, and that but slightly; that next the stem, on the upper side of the leaflet, so broad as to overlap that next to it, and so long as to partly cover the under leafit on the leaflet next above it. *Fructification* only at the top of the frond; the masses somewhat irregular in size, borne by the lowest branch of the side-veins, circular, with a cover depressed in the centre.

It is found on shady hedge-banks, and is more common than *P. aculeatum*, which is some evidence that it is not a variety of that species.

We extract from Mr. Francis's "Analysis of British Ferns" the following list of the places where it is found:—

"Extremely common in Scotland and in the north of England, gradually losing itself towards the south, and becoming more and more intermingled with *aculeatum*, which in its turn is superseded still more southerly by *angulare*. In the middle and south of England its recorded habitats are Leicestershire; common about Settle, Yorkshire; Pottery Car, near Doncaster; Matlock, Derbyshire; at Studley, Sambourne, Overley, and Weatherly, Warwickshire;

Lane leading to the Vachè from Chalfont, Bucks; near Bristol; near Dorking, Surrey; in Hants, &c.; near Yarmouth; Sussex and S. Kent. *Wales*—near Wrexham, Denbighshire. *Ireland*—Colin Glen, near Belfast; Hermitage, County Wicklow; County of Derry. Glen Fee, Clova Mountains; Braid Woods, near Edinburgh."

It is even hardier than *P. aculeatum* and *P. angulare*, and may be cultivated like them in every particular.



POLY'STICHUM LONCHI'TIS.

POLY'STICHUM LONCHI'TIS.

THIS Fern has been included by some modern botanists in the genus *Aspidium*, and by others in *Polypodium*. By the older botanists it was called *Lonchitis*, which has always since been retained as the specific name, and is appropriate, *logchitis*, in Greek, signifying "resembling a spear," which is applicable to its leaves. In English it is known as the *Holly Fern*, being evergreen, dark-coloured, leathery, and prickly, *Rough Alpine Shield Fern*, *Royal Polypody*, *Great Spleenwort*, and *Spleenwort Polypody*.

Its *root* is tufted, large, coarse, scaly, black, and having numerous fibrous rootlets. *Fronds* in a circle round the crown of the root, and leaning outwards in a cup-like arrangement, varying from six inches to fifteen or more inches in height, narrow spear-head shaped in their general outline, stiff and harsh, colour very deep glossy green. *Stem* furrowed in front, clothed for three-quarters of its length with leaflets, and the unleafleted part covered with broad, large, tapering, dark brown scales. *Leaflets* crowded, so as to overlap the one next below, short-stalked, about three-quarters of an inch long, alternate, smooth on the upper surface, rather scaly on the under surface, pointed egg-shaped, but rendered irregular by a lobe near the base on the upper side, saw-edged, the teeth being irregular and fringed with sharp bristles. The mid-vein of each leaflet straight, with alternate side-veins, these being

also branched. The *fructification* is borne by the lowest upper branch of each side-vein, forming a row of masses pretty close to, and on each side of, the mid-vein. The lobe of the leaflet has a small mid-vein of its own, and masses of fructification are on each side of it. The fructification rarely occurs except upon the upper leaflets of the fronds. The cover (*indusium*) of each mass is circular, fixed by the centre, notched on one side, and separating all round as the sori, which are light brown, increase in size.

This species is rare, and found only in mountainous districts in the north of the British Islands. Its favourite haunts are the clefts of rocks near the mountain tops.

In *England* it has been found about the upper part of the Tees; near Settle, in Yorkshire; on Swarth Fell, near Ulleswater, and other parts of Cumberland.

In *Wales*, at Clogwyn-y-Garnedh, Snowdon; and on Glyder, near Llanberris.

In *Scotland*, very common in the Highland valleys and exposed mountain sides. On the Bredalbane Mountains, Perthshire, at an elevation of about 3,000 feet; Craig Chailleach, Perthshire; Clova Mountains, and Glen Isla, Forfarshire; on Ben Lawers, and Falcon Clints, near Chaldron Spout, Teesdale; Aberdeenshire, Moray, and Ross-shire; base of Benmore, Sutherland; on Ben Lomond; and in Glen Phee.

In *Ireland*, on Bandon Mountains; in a glen east of Lough Eske, Donegal; and on Glenade Mountain, Leitrim.

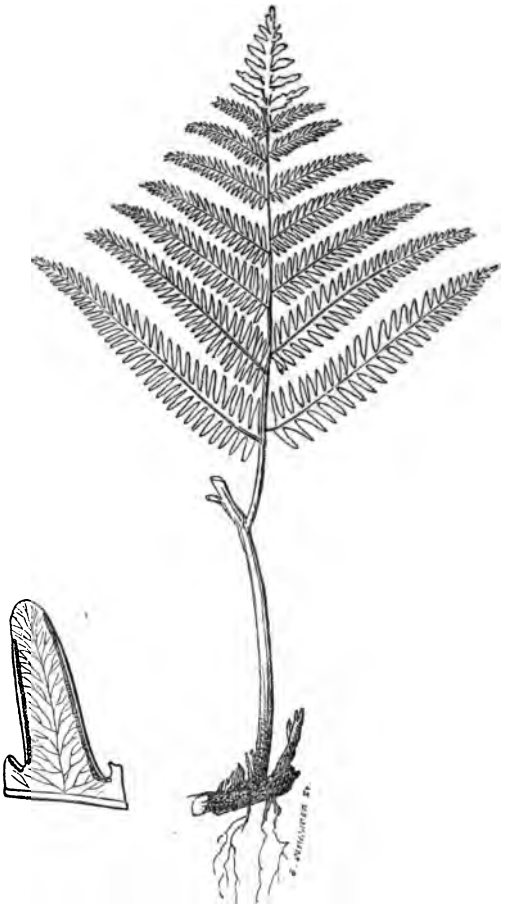
Polystichum lonchitis was not known as a British

Fern when Ray published, in 1670, his *Catalogus Plantarum Angliæ*, nor when his *Historia Plantarum* issued from the press, in 1686, but it had been discovered by Mr. Lloyd between that year and 1696, when Ray mentions it in the second edition of his *Synopsis Stirpium Britannicarum*. He adopted the name of *Lonchitis aspera major*, or "larger rough Spleenwort with indented leaves." He says, "It issues from clefts in the rocks on the tops of the mountains of Wales, as at Clogwyn-y-Garnedh-y-Grib-Goch-Trygvylchan (*D. Lhwyd*)."

Mr. W. Reeve observes that it is a very ornamental little plant when it can be cultivated successfully. He grew it in a cool house, where it was constantly shaded, and upon a damp bottom, with great success. He employed a compost of sandy loam and peat in equal parts, with a liberal admixture of sharp sand. It may be cultivated upon the rockery, but great care is necessary, it being a very shy plant to establish itself in dry, exposed situations. A shady part of the rockery must be selected, where it can be kept damp; but it will not bear stagnant moisture. It must be planted firmly in the compost above-mentioned as early in the spring as possible; and if a hand or bell-glass can be kept over it for a short time all the better, as this will keep the soil moist about it for some time without the application of much water. Give a little air occasionally.

It will thrive remarkably well in a greenhouse, and Mr. Reeve had it produce fertile fronds abundantly in a stove temperature. It is difficult to increase except by

the seed, which should be sown as soon as ripe, and treated in the same manner as directed for other Ferns. A cold pit will meet its requirements during the winter months, and in the summer also if kept shaded and damp.



PTE'RIS AQUILI'NA.

PTE'RIS AQUILI'NA.

With but two exceptions all modern botanists have described this very common Fern under the above names. Mr. Newman alone has called it *Eupteris*, and Mr. Bernhardt considers it an *Asplenium*, but both still retaining the specific name *aquilina*. This specific name was given by Linnæus because, when a slanting cut is made through the body of the main root, the surfaces represent in their woody tissue a figure somewhat resembling a spread or displayed eagle. In English it has been called *Brakes*, *Female Fern*, *Braken*, *Eagle Fern*.

Root creeping, widely extending, brown and downy when young, smooth and black when old. Rootlets fibrous and downy. *Fronds* produced singly along the root, upright, and from one to eight feet high. In one instance it was found thirteen feet high. *Stem* half its length without branches, angular, pale yellowish green, but purplish at the lower part, stiff, branched. *Branches* horizontal, spreading, with smooth stalks, the primary branches nearly alternate, and the next more decidedly alternate, the leafy portion deeply cut into close, spear-head-shaped, bluntish, convex, opposite segments, the end one usually much the largest, all smooth, and of a light, bright green colour on the upper surface, but paler and hairy underneath; edges of the segments brownish, rolled back, and wavy, inclosing the fructification. There is a mid-vein in each segment, and this

mid-vein produces side-veins in opposite pairs, which are variously branched; these branches unite at the edge of the segment, and where they unite is the *fructification*. This is in a continued line, the masses of spores being covered with a whitish membrane, which seems to be an extension of the outer skin of the leafy segment.

This Fern is variously modified by the situation in which it grows; its segments are sometimes quite entire-edged, and this variation has been called *integerrima*. In another variation the edges of the segments are excessively curled or crisped. This, however, differs from the *Pteris crispa* of some botanists, which we have described as *Allosorus crispus*.

It is useless to particularise the localities of this Fern, for it is found on barren heaths and in woods wherever the soil is a siliceous sand. It is much rarer in districts where chalk abounds.

Turner, writing of this Fern in 1562, says in the second part of his "Herbal,"—"Not onlye the opinion of the commen people is that the Ferne hath sede, but also it is the opinion of a Christen Physicion, named Hieronymus Tragus, who doth not onlye saye that Ferns hath sede, but wrytith that he founde upon mydsomer even sede upon *Brakes*. I have taken oute of his herball his wordes concernynge that matter, and have translated that into Englishe after this maner followinge. Although that all they that have written of herbes have affyrmed and holden that the *Brake* hath nether sede nor frute, yet have I dyvers tymes proved the contrarye, whiche thinge I will here testefye. I have foure yeres

together, one after an other, upon the vigill of Saynt Johne the Baptiste (which we call in Englishe mydsomer even), soughte for this seede of *Brakes* upon the nyghte, and in dede I fownde it earlye in the mornynge before the daye brake; the sede was small, blacke, and lyke unto Poppye. I gathered it after this maner: I laide shetes and wollen leaves underneath the *Brakes*, which receyved the sede that was by shakynge and beatynge broughte oute of the branches and leaves. Manye Brakes in some places had no sede at all, but in other places agayne a man shall fynde sede in every Brake. I went aboute this busyness all figures, conjurynges, saunters, charmes, wytchcrafte, and sorseryes sett a syde, taking with me two or three honest men to bere me companye. When I soughte this sede all the villagers aboute did shyve with bousyers, that the people made there."

We have more fully narrated the old superstitions relative to "Fern seed" at pp. 158—161. We will now turn to more profitable matter—the uses to which *Brakes* are applied. These are well epitomised by Mr. Lightfoot as follows:—

"The root is viscid, nauseous, and bitterish, and, like all the rest of the Fern tribe, has a salt mucilaginous taste. It creeps under the ground in some rich soils to the depth of five or six feet, and is very difficult to be destroyed. Frequent mowing in pasture grounds, plentiful dunging in arable lands, but, above all, pouring urine upon it, are the most approved methods of killing it. It has, however, many good qualities to counterbalance the few bad ones. Fern cut while green, and left to rot upon the ground, is a good

improver of land; for its ashes, if burnt, will yield double the quantity of salt that most other vegetables will.

"Fern is also an excellent manure for Potatoes; for, if buried beneath their roots, it never fails to produce a good crop.

"Its use as a good litter in the stable and the fold is known to every farmer; as, also, that it makes a brisk fire, when dried, for the purposes of brewing and baking.

"Its astringency is so great that it is used in many places abroad in dressing and preparing kid and chamois leather.

"In several places in the North the inhabitants mow it green, and, burning it to ashes, make those ashes up into balls with a little water, which they dry in the sun, and make use of them to wash their linen with instead of soap.

"In many of the Western Isles the people gain a very considerable profit from the sale of the ashes to soap and glass makers.

"In *Glen Elg*, in *Inverness-shire*, and other places, we observed that the people thatched their houses with the stalks of this Fern, and fastened them down with ropes made either of Birch bark or heath. Sometimes they used the whole plant for the same purpose, but that does not make so durable a covering.

"Swine are fond of the roots, especially if boiled in their wash.

"In some parts of *Normandy* we read that the poor have been reduced to the miserable necessity of mixing them with their bread; and in *Siberia* and some other Northern countries the inhabitants brew them in their ale, mixing one-third of the roots to two-thirds of malt.

"The ancients used the root of this Fern, and the whole plant, in decoctions and diet-drinks, in chronic disorders of *all kinds*, arising from obstructions of the viscera and the

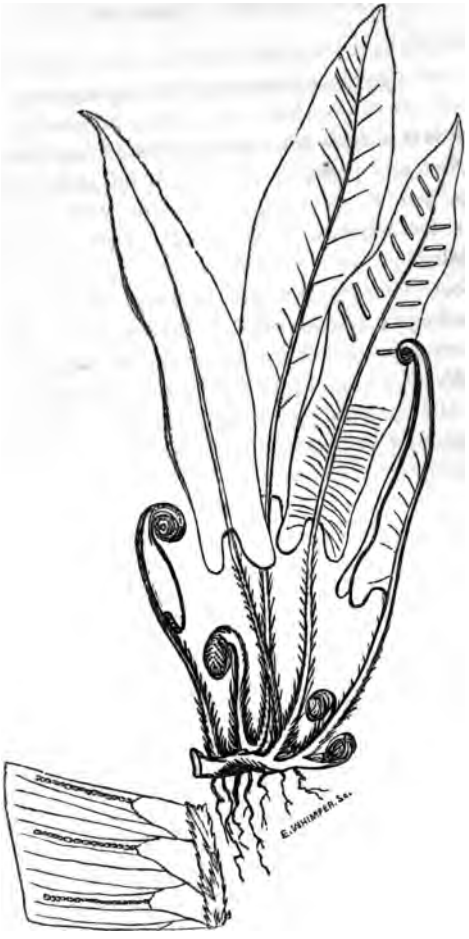
spleen. Some of the moderns have given it a high character in the same intentions; but it is rarely used in the present practice. The country people, however, still continue to retain some of its ancient uses, for they give the powder of it to destroy worms, and look upon a bed of the green plant as a sovereign cure for the rickets in children."

The ancients were correct in their estimate of the fattening qualities of the Brake, and it has been proved in modern days. At Nettlecombe, in Somersetshire, it is, or was, customary to gather the young shoots of this Fern, and to simmer them for two hours in water. When cold the liquor forms a strong jelly, and is as effectual as potatoes for pig food.

Professor Sprengel recommends all Ferns, and especially the Brake, as a good manure. He says that 10,000 parts of the fresh-gathered, air-dried herbage contain of mineral substances 1,040 parts silica, 433 lime, 152 magnesia, 1,050 potash, 370 soda, 052 alumina, 150 oxide of iron, 036 oxide of manganese, 095 sulphuric acid, 060 phosphoric acid, 258 chlorine = 3,696 of mineral substances. This Fern, he adds, is rendered still more valuable as a manure by its richness in nitrogen. He found that 100 lbs. of its dry herbage contain 16-100ths of a pound of nitrogen, and, consequently, 3000 lbs. = 45 lbs.

If cultivated, it must be grown in a deep, sandy soil, and in the shade, or the specimens will not be fine. It should be covered over with leaf mould every winter, for the roots are very liable to suffer from severe frost. To protect them further, and, indeed, for ornament, let the

dead fronds remain until the spring. To propagate it, take up the creeping main root early in spring; have the ground trenched ready, draw drills about two inches deep, lay the roots along the drills thickly, and cover them with the soil.



SCOLOPE'NDRIUM VULGA'RE.

SCOLOPE'NDRIUM VULGA'RE.

THIS is the *Asplenium scolopendrium* of Linnæus, and the *Scolopendrium officinalis*, *S. phyllitis*, *Phyllitis vulgaris*, and *P. scolopendrium* of some other botanists. It is the *Common Hart's Tongue Fern* of English herbalists.

Root compact, penetrating deeply, tufted, slowly spreading by forming offsets round the crown. *Fronds* numerous, usually from six to eighteen inches high; but Mr. C. Johnson founds pecimens in the open vault near the great hall of Conway Castle four feet long, and nearly four inches broad. *Stem* one-third without any leafy development, and this unleafed part is dark purple-coloured and shaggy, with narrow, brown, membranous scales; but sometimes it is smooth. The general outline of the leafy portion is long, narrow, heart-shaped, and pointed, smooth, entire at the edge, but somewhat wavy, bright grass green. The leafed portion of the stem is also covered with scales, but they are smaller; it puts forth on each side a regular series of three-branched veins, each branch being two-forked, and where the outer forks almost join the outer forks from the next veins there is apparently a single line of *fructification* throughout their length, but each of these adjoining forks produces fructification, and the masses run together. The fructification occurs only about the upper part of the frond, and is composed of numerous small brown capsules, rising up through a pale brown,

membranous cover, which folds over them in their early growth, but in their state of ripeness remains nearly erect on each side.

There are eight forms into which the fronds pass, but they so frequently occur with the fronds of the usual form that they can scarcely be considered varieties. 1. *Polyschides* has a scolloped, finely-plaited edge. 2. *Crispum* has the edge very wavy and curled. 3. *Marginatum*, with the edge double, or, as it were, with a hem. 4. *Hastatum*, with a pair of spreading lobes at the base. 5. *Lobatum*, or rather, *furcatum*, for the point of the frond is divided into two irregular ends. 6. *Multifidum*, or many-cleft at the point. 7. *Laceratum*, torn, the whole frond, both at the edges and point, being deeply cut. 8. *Ramosum*, branched, the stem divided in two, and the points of the twin fronds much lobed and crisped.

The *Hart's Tongue* is one of the commonest of our Ferns, and is to be found almost in every county of the British Islands.

It was known to Turner, Gerarde, Ray, and other ancient herbalists as *Phyllitis*, and even the *lobatum* variety is described and depicted by Gerarde under the name of *Phyllitis multifida*. He says he found it "in the garden of Master Cranwich, a chirurgion dwelling at Much-Dunmow, in Essex," "who," he adds, "gave me a plant for my garden."

This Fern looks noble by itself, and also forms a very striking object when grown in a collection of pot plants, or on a rockery, from neither of which it should be

absent. It is easily established. It is very distinct from all other British Ferns, and it is, moreover, a plant that will take its place on any part of the Fernery or rockwork, being not so particular as many other Ferns. But, although it bears exposure as well as any of our native species, still greater luxuriance may be obtained by placing it in deep, shady places. It is remarkably well adapted for planting about the shrubbery, wilderness, and such-like places, in clumps accompanied with masses of rock, stone, &c. This and *Lastræa filix mas* look extremely well together in such clumps. Two parts loam, with one part each of leaf mould and peat, will form a suitable compost, with the addition of sand and some finely-broken sandstone, broken pots, or a little old mortar. This Fern requires potting or planting rather firmly, a good drainage, and a moderate supply of water. It will bear any temperature from the severest winter frosts to the temperature of a stove, in which it thrives remarkably well. It may be propagated either by division or by seed, in the same way as directed for former species.

TRICHO'MANES BREVISE'TUM.

This has been commonly included in the genus *Trichomanes*, but with the various specific names of *radicans*, *speciosum*, *Europæum*, *alatum*, *pyxidiferum*, *Tunbridgense*, *var.* 3, and *Andrewsii*. By a few botanists it has been called *Hymenophyllum alatum*, *Hymenophyllum Tunbridgense*, *β*, and *Didymoglossum alatum*. In English it is known as the *Short-styled Bristle Fern*, and *Cup-Goldy-locks*

Root very thick, cylindrical, creeping, black, densely hairy, with numerous stout, scattered, branched, vertical rootlets. *Fronds* issuing singly, irregularly, from the upper side of the root; erect, from five to twelve inches high, dark, transparent green, narrow egg-shaped in general outline. *Stem* winged, and from one-fourth to one-half bare of leaflets. *Leaflets* with two leafits at their base, and their upper portion irregularly but alternately lobed. Both leafits and lobes cut into deep, blunt segments. A few of the upper segments end in a single, imbedded, oblong, cylindrical cup, continued from the leaf, slightly winged at the sides. *Fructification* round the bottom of a little column in that cup.

This very rare Fern is found in watery places, and on wet rocks.

In *England* it has been found at the head of Elm Crag Well, at Belbank, half a mile from Bingley, Yorkshire.



TRICHO'MANES BREVISE'TUM.



We are not aware that it has been found either in Wales or Scotland.

In *Ireland* it is more common, being found at Powerscourt Waterfall and various parts of Kerry; on shady banks and rocks exposed to the spray of the waterfall above Turk Cottage, Killarney, growing with the equally rare *Jungermannia Hutchinsiæ;* Hermitage, in the county of Wicklow; Ballinbasy Glen, near Cork; and Glendine, near Youghal.

It is first mentioned as a British Fern by Dillenius in the third edition of Ray's *Synopsis*, published in 1724. He states that it was found by Mr. Richardson at Belbank, and it has been found there since. The copper plates given by Dillenius establish the identity beyond any doubt, even if his description were not sufficient for doing so. *Filix humilis repens, foliis pellucidis et splendentibus, caule alato* (Dwarf Creeping Fern, with transparent and shining leaves, and with winged stem).

This Fern, Mr. W. Reeve informs us, is one of the more delicate of the British Ferns. When successfully grown it is one of the most interesting of the smaller species. It is useless to attempt to cultivate it upon an exposed situation, it being so partial to a close, calm, moist, and warm atmosphere, and when once dislodged from its native place it is very difficult to establish it otherwise than with these conditions. It may be successfully grown in a pot by first filling a middling-sized pot one-third full of finely-broken potsherds or sandstone, putting upon this a layer a little finer, and filling the remaining space with a compost of fine loam, silver

sand, and finely-powdered sandstone in equal parts. This is to be pressed firmly together, and then the caudex or main root very carefully arranged upon the surface, fixing it by means of a few very small hooked pegs—the smaller in size and quantity the better. Then strew a little sand and powdered stone over the surface, just enough to cover and settle the roots. This being done, the whole is to receive a liberal watering from a very fine-rosed watering-pot, and left for a short time to settle. Place the pot in a saucer, the top of which is to be below the level of the top of the first layer of stone in the pot. This saucer is to be kept full of water, with a bell-glass turned over the pot, and to rest in the saucer of water. Place the whole in a warm green-house or stove, and by keeping the saucer filled with water success may be relied upon. Similar directions may be followed for cultivating this Fern upon a larger scale. Be careful always to keep the atmosphere moist and warm, which moisture will be secured by keeping the pan full of water. This Fern may be increased by division, although very shy of this process, and also by its seed, or fructification, which is, perhaps, the best mode, although this Fern is very delicate and tender in a young state.





WOO'DSIA HYPERBO'REA.

WOO'DSIA HYPERBO'REA.

THIS has been called *Acrostichum alpinum*, *Ceterach alpinum*, *Polypodium hyperboreum*, *P. Arvonicum*, and *Woodsia alpina*. By some botanists it is considered merely a variety of *Woodsia Ilvensis*. In English it is known as the *Alpine Woodsia*, *Rounded-leaved Woodsia*, and *Hairy Polypody*.

Its *roots* are fibrous, very deeply penetrating, black, and tufted. *Fronds* narrow spear-head shaped in their general outline; the lower third of each stem is without leaflets, but having a few hairs and light brown chaffy scales. The stem is united to the root by a joint, from which it falls off when the frond decays in autumn. *Leaflets* in pairs, quite or nearly opposite, smooth, triangular in their general outline, but with the angles rounded; deeply lobed and scolloped; mid-vein not strongly marked, and its side-veins are simple or only two-forked, reaching nearly to the edge of the lobes, and not far from the end of these side-veins is the *fructification*. This consists of from six to ten circular masses on each leaflet; they are large, light brown, and usually increase in size until they run together. The cover (*indusium*) of each mass is divided into such numerous segments that the fructification seems imbedded in hairs. This appears fully in our woodcut of *Woodsia Ilvensis*.

In *England* and *Ireland* this very rare Fern has never been found.

In *Wales* it has been discovered at Clogwyn-y-

Garnedh and Moel Sichog, on Snowdon, at an elevation of not less than 2,500 feet. It is said to have grown on Glydr Fawr, Caernarvonshire, but recently it has been sought for there without success.

In *Scotland* it occurs on Ben Lawers, Ben Chowzie, and the Clova Mountains; at Craig Chailleach and Mael Ghyrdy, in Perthshire; and in Glen Fiadh, in Forfarshire.

We think it probable that this Fern is the *Filix Caledonica* mentioned in 1704 by Ray, in the third volume of his *Historia Plantarum*, as being in the museum of Mr. Petiver. Whether this be so or not, Ray mentions it in the second edition of his *Synopsis Stirpium Britannicarum*, published in 1696, where it is described by Mr. Lhwyd, its discoverer, as *Filix alpina pedicularis rubræ foliis subtus villosis* (Alpine Fern, with red-rattle leaves hairy underneath). It was described and engraved during the same year in Plukenet's *Almagestum Botanicum*, 150, *t.* 89, *f.* 8. Mr. Lhwyd says he never saw it except on wet, lofty rocks called Clogwyn-y-Garnedh, near the top of Snowdon, and that it is rare even there. It springs there from the edges of the rocks, not erect, but somewhat reclining. Dr. Richardson adds, in the third edition of the same *Synopsis*, that "it grows on a moist, black rock almost at the top of Clogwyn-y-Garnedh, facing north-west, directly above the lower lake."

We give the cultivation of *Woodsia Ilvensis*, and the *Woodsia hyperborea* requires similar treatment.



WOO'DSIA ILVE'NSIS.

WOO'DSIA ILVE'NSIS.

THIS Fern has been included by various botanists in the genera *Acrostichum*, *Lonchitis*, and *Polypodium*; but they have uniformly retained the specific name *Ilvensis*, which is one of the illustrations of the absurdity of naming a plant after the country where it was first found. *Ilvensis*, or *Elban*, refers to the Isle of Elba, where it was originally discovered; but since then it has been found in Britain, all over Germany, the Alps, the Pyrenees, Siberia, and even Greenland. The true rendering of the botanical name, then, is the *Elban Woodsia*; but it has also been called *Oblong Woodsia*, *Hairy Woodsia*, *Downy Hair Fern*, and *Opposite-leaved Polypody*.

Roots tufted, numerous, long, smooth, blackish, fibrous. *Fronds* several, in a tuft or group, erect, spear-head shaped in general outline, from two to five inches high. *Stem* pale brown, slightly scaly, very elastic and wiry, about one-fourth without leaflets, and jointed at a short distance from the roots. At that joint it falls off when decayed. *Leaflets* stalkless, egg-shaped, bluntly-pointed, deeply cut into segments, somewhat wavy, and rolled back at the edge; opposite at the lowest part of the frond, but alternate at the top; upper surface milky green, smooth, but sprinkled over with a few hairs or slender scales; under surface densely covered with similarly fine, glossy scales and jointed hairs, and nearly covered with fructification. *Fructification* in round,

convex masses, variously placed at the points of the very irregular and indistinct veins; the masses are separated whilst young, but soon become crowded. The *sori* are on a small, membranous, roundish cover, of which the edge is fringed with very long, taper, jointed, hair-like segments.

This, one of the rarest of our Ferns, is found only on the highest and bleakest of our mountains It has not been found in Ireland.

In *England* only on Falcon Clints, Teesdale, Durham.

In *Wales*, at Glyder-vawr, near Lyn-y-cwm, and Clogwyn-y-Garnedh, Snowdon.

In *Scotland*, between Glen Dole and Glen Phee, in the Clova Mountains, Forfarshire, at an elevation of between 1,600 and 1,700 feet.

Mr. W. Reeve states that the two Woodsias require the same treatment, and are cultivated chiefly for their minute beauty, being so small that they will be almost lost upon a rockery or Fernery of any size. They are, however, well adapted for cultivating upon small Ferneries, with such companions as *Asplenium trichomanes*, *Allosorus crispus*, the *Asplenium ruta-muraria*, and others. They may be cultivated, also, in pots successfully. They require a very open soil, composed of equal parts turfy peat and light loam, with a very free admixture of finely-broken charcoal, sandstone, and silver sand; the pots to be one-third filled with finely-broken crocks or sandstone; upon this is to be put a little sphagnum or fibry parts of the peat, and the remainder to be *filled* with the above compost, placing the little plant

in it as you approach towards the top, keeping the crown of the plant above the pot's rim, and round it placing a few small stones. Great care must be exercised so that the plants do not become water-logged, for this is almost sure death to them, they disliking nothing more than stagnated moisture. What moisture is given is best given by means of placing the pots in a saucer of water for a few minutes. When the moisture is seen rising through the surface remove the saucer, and set the plants again to drain.

The same directions may be followed in planting these Ferns in a rockery or Fernery, placing the pieces of rock or stone firmly round the base of the plant, so as to keep the soil firm to the roots. The plants may be increased by division, which will require great care and nicety. They may also be increased by the fructification. They succeed remarkably well in the close, warm temperature of a stove, but will do quite as well, and perhaps better, in a greenhouse.

APPENDIX.

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ASPLENIUM ADIANTUM-NIGRUM (p. 22).—Several other varieties of this Fern have been noticed; but not one of them, we think, would remain permanently varying from the normal form if all were subjected to the same soil, culture, degree of light, and climate as are most congenial to the type species. They are :—*Decompositum*, which differs from *acutum* in having the segments of the leafits less pointed, less rigid, and in being nearly quadri-pinnate—it occurs in Devonshire; *fissum*, also from Devonshire, has its leafits cut into fine pointed segments, which are, in fact, the usual teeth of the leafits more deeply divided—the rootstock (caudex) is longer than in the normal form; *intermedium* is really a less compound and enlarged form of *acutum*, it has occurred in the Channel Islands; *oblongum* has an oblong-formed frond, owing to the leaflets being more uni-

form in length than in the species; *oxyphyllum* is really only a narrower and diminutive form of *acutum*, occasioned, probably, by the cold climate of Argyleshire, where it was found.

ASPLENIUM FONTANUM (p. 29).—Mr. Moore thinks that a proliferous Fern, sent from Scotland and cultivated erroneously as *A. viride*, is really a variety of *A. fontanum*. As it has not yet been found wild in this country, we merely record Mr. Moore's opinion.

ASPLENIUM LANCEOLATUM *var.* MICRODON (p. 40).—This is a very distinct variety, and has been found in Cornwall, Devonshire, and Guernsey. The leaflets, broadly lanceolate, are so little divided that specimens have been mistaken for *A. marinum*; and the upper leafits so run together at their base as to form one large terminal leaflet with many lobes The fronds, also, in their outline are less lanceolate and more linear-shaped than those of the species, and the spores nearer the margins of the leafits.

There are two variations, not permanent, which only deserve a passing notice:—*A. lanceolatum crispatum*, with teeth of leafits undulating, so as to make the frond rather crisped; and *laciniatum*, in which the leafy part of each leafit is so deficient, that many are little more than the mid-rib.

ASPLENIUM MARINUM (p. 47).—There are some other variations in form:—*assimile*, with leaflets lengthened and lobed as in *A. caudatum*, or eared

as in *A. auritum*. Then there are *crenatum*, with leaflets trapeziform and scolloped or crenate; *cuneatum*, with leaflets having a wedge-shaped base; *incisum*, with the lobes of the leaflets deeply incised; and *ramosum*, with fronds branched or in pairs.

ASPLENIUM RUTA-MURARIA (p. 51).—The variations in form which have been observed are—*cuneatum* with leaflets wedge-shaped below and truncated above; *cristatum* with fronds tasselled at top; and *dissectum* with its leafits deeply and finely cut; *pinnatum* is pinnate; and *unilaterale* has its leaflets all growing in one direction, so as to appear one-sided, like the head of the Tartarian Oat.

ASPLENIUM TRICHOMANES (p. 61).—There are some variations of form—as *bifurcum*, having the terminal leaflet of the frond forked or divided into two or three lobes; *cristatum*, with the ends of the fronds tasselled; *depauperatum*, with leaflets nearly or entirely without any leafy part attached to their mid-rib; *lobatum*, with leaflets more or less lobed at the base; *multifidum*, with fronds divided into little crisped branches at their top; *ramosum*, much branched lower down the fronds; and *sub-æquale*, with the leaflets almost equal-sided.

ASPLENIUM VIRIDE (p. 68).—A third variation in form is *acutum*, having leaflets spear-head-shaped and pointed. The other two variations have been respectively called *multifidum* and *bi-pinnatum*.

ATHYRIUM FILIX-FŒMINA (p. 74).—We will merely

particularise slightly the other variations of form which have been noticed. *Acuminatum*, leaflets crowded and pointed; *caudiculatum*, leaflets and leafits irregular and profusely crisped; *confluens*, leaflets crowded and confluent; *corymbiferum*, fronds tasselled symmetrically in a corymb form and crisped; *crispum*, branched, and leaflets crisped, known in gardens as *A. filix-fœmina Smithii*; *davallioides*, spores near the edge, and bulging so as to resemble the genus Davallia; *depauperatum*, fronds divided at top into several stem-like segments, leaflets irregularly furnished with leafy surface; *diffisum* and *dissectum* have distant, unequal, decurrent leaflets, with deeply cut toothed lobes, and differ only in *dissectum* having its fronds short and broad; *erosum*, leafits toothed and cut very irregularly, and partly without leafy surface; *excurrens*, leafits oblong, connected by their wings, and teeth hair-pointed; *frondosum*, fronds and leaflets broad, and leafits broad and deeply pinnatifid, giving a very leafy appearance; *furcatum*, fronds tasselled, and leaflets forked; *gracile*, graceful from its fronds and all their parts being slender and tending to a linear form; *inexpletum*, fronds rather tasselled, and all the leafits more or less devoid of leafy surface; *interruptum*, leaflets generally shortened, and their ends truncated; *irregulare*, leafits of the lower leaflets very much but irregularly shortened; *latifolium*, leaflets very close together, leafits imbricate, giving the whole

frond a crowded aspect; *laciniatum*, leafits varying in form and size as well as in their deep cuttings; *laxum*, fronds large, loose, and broad; *marinum*, leaflets crowded, leafits united at their base; *multifidum*, ends of the fronds and of the leaflets much cut, disposed in a corymb form and crisped; *obtusum*, fronds broad, leaflets very obtuse or blunt-ended; *odontomanes*, teeth of the lobes of the leafits elongated and very pointed; *ovatum*, leafits short and sub-ovate; *polyclados*, branched unequally, leaflets and leafits very irregular and unequal in size and cuttings; *polydactylon*, fronds forked more than once at the end, leaflets forked but not crisped; *præmorsum*, leaflets united at their base, and cut irregularly as if bitten; *pruinosum*, stems and leaflet-stalks hoary with small glands; *ramosum*, unequally branched, leaflets and leafits very irregular and unsymmetrical; *stenodon*, leafits crowded, with toothed lobes below, but simply toothed above, teeth conspicuously long; *thyssanotum*, like *multifidum*, only the leafits flat and broader; and *undulatum*, very like *incisum*, but the leafits crowded and wavy, so as to seem finely crisped.

BLECHNUM BOREALE.—The first of the varieties mentioned at p. 80 is called *heterophyllum*, and the second *multi-furcatum*. Besides, other variations of form occur. These are *bifidum*, with lobes split in two; *crispum*, with end of frond tasselled; *fissum*, with stalk split in two or more divisions; *multifidum*,

with top lobes much divided; *ramosum*, fronds branched at the top and much crisped; *serratum*, with lobes scolloped or broadly toothed; *strictum*, with lobes irregularly shortened; and *trinervium*, with fronds trifoliate.

CETERACH OFFICINARUM (p. 92).—Two slight variations in form have been noticed and named:—*crenatum*, with edges of the lobes scolloped; and *depauperatum*, with the lobes of very varying forms, and sometimes nearly obliterated.

LASTRÆA CRISTATA (p. 143).—One variation of this has been observed—*uliginosa*, with its leafits more pointed; but this and other minute differences are not permanent.

LASTRÆA DILATATA (p. 149).—No Fern is liable to more trivial alterations of form than this. Those who wish for full particulars relative to these, and the variations of other species, cannot do better than consult "The Handbook of British Ferns," written by that entire master of his subject, Mr. Moore, Curator of the Chelsea Botanic Garden. We shall do little more than enumerate those variations. *Alpina*, fronds narrow; *angusta*, fronds narrow, bi-pinnate; *Chanteriæ*, fronds narrow, truncated at bottom; *collina*, fronds narrow-ovate; *deltoidea*, fronds deltoid; *distans*, leaflets distant from each other; *fuscipes*, stem brown behind; *glandulosa*, fronds thickly clothed beneath with stalked glands; *interrupta*, leafits irregular, and partly without leafy

surface; *lepidota*, stem and leaf-stalks covered with contorted scales (Mr. Moore doubts this being native, or, if native, whether it is not a new species); *micromera*, leafits very finely divided; *nana*, fronds dwarf, ovate; *obtusa*, leafits blunt; *pumila*, fronds small, "perhaps only a young state of some of the larger forms;" *Schofieldii*, very small, branched and crisped; *Smithii*, probably another variation of *collina*; *tanacetifolia*, fronds triangular and leafits finely divided; and *valida*, fronds leathery-looking, leafits very deeply divided.

LASTRÆA FILIX-MAS (p. 155).—The other variations in form which have been noted are—*cristata*, fronds and leaflets crisped at the top; *elongata*, leaflets very long-pointed; *deorso-lobata*, merely *incisa* with a large lobe at the base of the lower leafits; *interrupta*, leafits here and there deficient in leafy surface; *Jervisii*, fronds and leaflets slightly tasselled; *monstrosa*, like *cristata*, but parts broader; *multifida*, fronds much divided at top; *paleaceo-lobata* is merely *paleacea* with lobed leaflets; *Pinderi* is *paleacea* with fronds narrowed at top and bottom; *producta* is only *incisa* lengthened and narrowed upwards; *polydactyla*, fronds and leaflets much cut and crisped at top; *pumila*, fronds dwarf and glandular; *subintegra*, leaflets very blunt, and slightly pinnatifid; *triangularis*, some of the lower leafits triangular.

LASTRÆA OREOPTERIS (p. 171).—Two variations in form have been observed; *crispa*, crisped, from the

leafits being wavy; and *truncata*, having its fronds and their leaflets terminating abruptly.

POLYPODIUM ALPESTRE (p. 205).—There are three variations of this Fern recorded, of which *flexile* is a very permanent and decided variety. Its leaflets are much shorter, with only six or eight pairs of leafits, consequently rendering the outline of the fronds much more narrow and flexible; the leafits are stalkless and united at the base; stem either very short or entirely absent. *Lanceum* differs chiefly in outline of form, and in its leafits being subfalcate; *tri-pinnatum*, more uniformly tri-pinnate, and the leafits very long.

POLYPODIUM VULGARE (p. 228).—The mere variations are—*auritum*, with small ear-lobes at the anterior base of the lobes; *crenatum*, with crenated lobes; *denticulatum*, lobes finely toothed; *interruptum*, lobes irregular and some deficient; *laciniatum*, lobes notched and rather crisped; *marginatum*, with epidermis rolled back from under margin of lobes; *multifidum*, with top of frond much divided; *omnilacerum*, lobes irregularly pinnatifid; *ovatum*, fronds ovate; *serrulatum*, lobes minutely serrate; *sinuatum*, lobes wavy; and *truncatum*, fronds occasionally abrupt, and deficient in the leafy portion.

POLYSTICHUM ANGULARE (p. 240).—Some other variations of form have been noticed. *Acutum*, with falcate-pointed leafits; *alatum*, having the leafits united at the base by an enlarged wing or lobe on

each side; *bi-serratum*, with double-toothed leafits; *cristatum*, with fronds and leaflets very crisped at their tops; *confluens*, upper leafits confluent; *decompositum*, being tri-pinnate; *densum*, leafits crowded; *depauperatum*, often so deficient in leafy surface as to have little but the mid-ribs; *dissimile*, leafits irregular in shape, and leaflets varying in form; *grandidens*, leafits cut into large teeth; *hastulatum*, leafits with a prominent pointed ear; *imbricatum*, leafits roundish and imbricated; *incisum*, like *sub-tri-pinnatum*, only with upper leafits more cut and jagged; *irregulare*, leafits variable, and upper leaflets defective in leafy surface; *præmorsum*, leafits abruptly terminated, and jagged; *sub-tri-pinnatum*, fronds sub-tri-pinnate, leafits at base of leaflets sub-pinnate.

SCOLOPENDRIUM VULGARE (p. 264).—There are very many other trivial variations of form, but which are really so transient as scarcely to deserve particularising. *Abruptum*, fronds blunt; *apicilobium*, fronds broadest above; *bi-marginatum*, with the membrane beneath the fronds excurrent, with cup-shaped excrescences on the upper surface; *chelæfrons*, fronds bifurcate at top; *compositum*, fronds undulately crisped at the top and bottom, but marginate and toothed in the middle; *crenato-lobatum*, upper part of fronds crenato-lobate; *coriaceum*, very thick and dentate; *crista-galli*, thickly crested at top; *cristatum*, tasselled heads rather larger than in *digitatum*, which is also thickly crisped; *fissum*, margin deeply cut and

toothed; *fimbriatum*, deeply lobed, and the lobes frilled; *flabellatum*, deeply forked and fan-shaped at top; *glomeratum*, a crisped mass from repeated forking; *inæquale*, differing from *obtusi-dentatum* chiefly in having a broader lobe or branch irregularly placed; *inops*, dichotomously divided; *irregulare*, some fronds normal, but others undulately lobed, and others forked; *imperfectum*, margin apparently cut away irregularly down to the sori; *jugosum*, sorus-like ridges on the upper surface; *lacerato-marginatum*, a small marginate form of *laceratum*; *lanceolum*, fronds narrowing downwards, but eared at the base; *macrosorum*, sori broad, margin frilled, very like *polyschides*; *muricatum*, upper surface rather regularly ridge-and-furrowed; *multiforme*, frond sometimes branchy, at others subulate, marginate, depauperate, &c.; *nudicaule*, fronds variable, stems quite smooth; *obtusi-dentatum*, deeply lobed, and lobes uniformly bluntly toothed; *pachyphyllum*, fronds robust, crenate, rather multifid at top; *papillosum*, warty on the upper surface; *peraferum*, partially crenate, and top gathered into a kind of pouch; *pocilliferum*, irregularly lobed, or forked, with some cup-shaped excrescences on upper surface; *proliferum*, a bulbiferous variation of *marginatum*; *ramo-marginatum*, fronds branched and profusely crisped; *ramosum majus*, fronds large, and joined two or three together by their stems; *rimosum*, top lobed and dentate; *resectum*, crenately lobed, but ear-lobes

quite absent; *retinervum*, fronds irregularly strap-shaped, veins often reticulate; *sinuatum*, margin irregularly sinuated; *spirale*, fronds twisted like a corkscrew; *striatum*, variegated by oblique yellowish-green streaks; *sub-variegatum*, fronds very varying in form, slightly streaked lengthways with white; *sagittifolium*, ears at the base distinctly mid-ribbed; *sagittato-cristatum*, base of fronds sagittate, rather crisped at top; *sculpturatum*, upper surface irregularly carved or uneven; *siciforme*, fronds narrow, obscurely eared, sori appearing on upper surface; *sub-marginatum*, fronds varying, often branched, partially marginate, sometimes only a rib; *supra-lineatum*, ridged on the upper instead of the under surface; *supra-lineato-resectum*, like *resectum*, and ridged like *supra-lineatum*; *variabile*, fronds sometimes kidney-shaped, often merely two round lobes, sometimes multifid at top. This is more permanent than most of the preceding

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N.B.—Those names *not* in capitals are synonymes and English names.

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